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ABSTRACT

Presented is a working paper which reviews the research on learning, language, social behavior, and curriculum for moderately retarded children IQs from 30 to 50 and provides a bibliography of approximately 1,000 items. The review of the research covers learning processes of the moderately retarded in sections on reinforcement, discrimination learning, information processing, and academic learning; language learning in the moderately retarded in sections on language and cognition, language assessment, and language programs; social behavior with emphasis on the improvement of adaptive behavior; and curriculum research. Discussed are implications of the research for curriculum development such as cost effectiveness and procedures for development of a social curriculum which is planned to consist of three interrelated components (social learning, communication skills, and perceptual-motor skills in three phases (play, sensory awareness, and achievement). The bibliography provides an alphabetical listing (by author) and a listing by the following topics: learning characteristics, behavior modification, Down's syndrome, communication, social behaviors, educational programing, curriculum guides, parent aids, and measurement. (DB)

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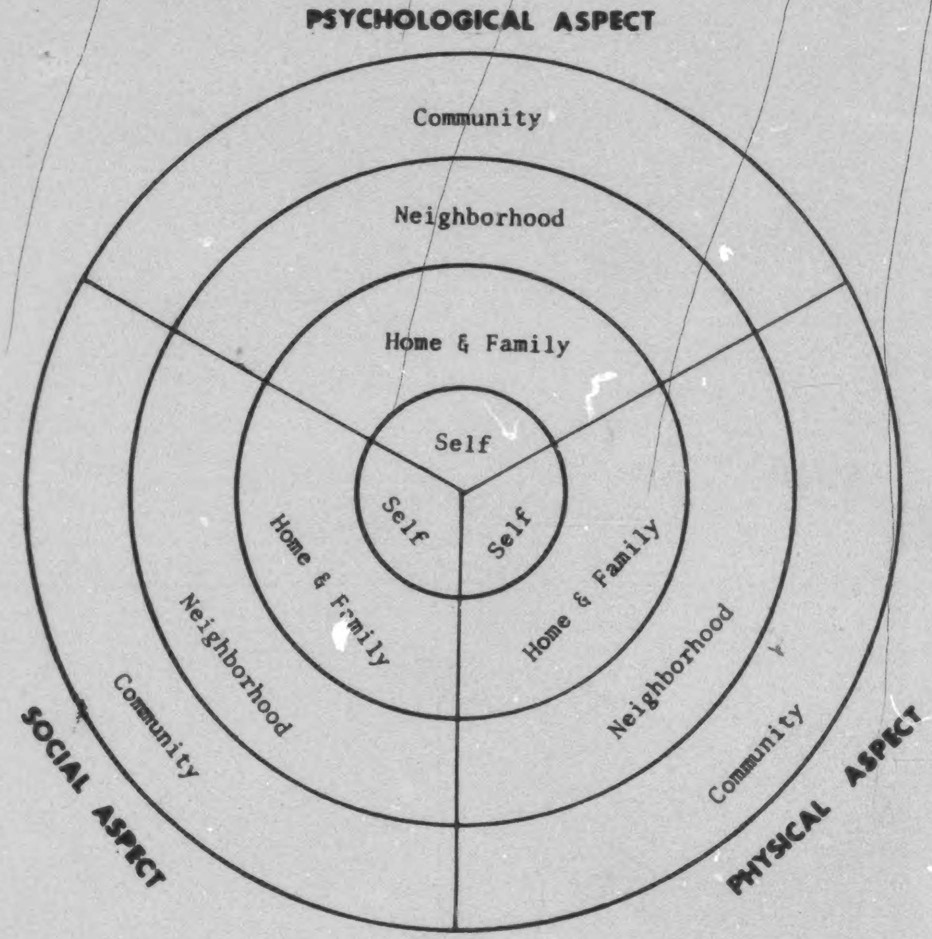
A WORKING PAPER

THE DEVELOPMENT OF A SOCIAL LEARNING CURRICULUM FOR MODERATELY RETARDED CHILDREN

Philip Reiss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PHYSICAL ASPECT

Social Learning Curriculum

Curriculum Research and Development Center
in Mental Retardation
Herbert Goldstein, Director

Ferkauf Graduate School
Yeshiva University, New York, N. Y.

September, 1974

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Introduction

The purpose of a curriculum is to present guidelines for effective program planning and to provide suggestions, activities, and teaching aids useful in the instruction of the child:

1. The curriculum should provide continuous experience that will develop the abilities and aptitudes of each pupil. To be effective, the program must offer a wide variety of experiences. Essentially, the curriculum must be shaped to fit the child rather than the child the curriculum.
2. The curriculum should provide opportunities for learning and progress for all aspects of child growth and development. In order to grow and develop, the child needs opportunities to participate in a wide variety of curricular experiences.
3. The curriculum should be grounded in the principles of learning (Little, 1966, p. 45).

In order to best fulfill these principles, it seems desirable for a curriculum to be developmental and hierarchically sequential in the treatment of subject matter. In developing curriculum, it is necessary to identify the population for whom the curriculum is intended, the needs of that population, and the educational goals and objectives the curriculum will be designed to meet.

It should be understood that the use of any psychometrically derived categorical label is only a temporary measure. The traditional terms (i.e., educable, trainable) are used primarily to facilitate communication between colleagues. Trainability is seen as essentially an expeditious label, implicitly referring to abilities or inabilities in mastering reading and arithmetic. It has been the Center's intention from the onset of the present endeavor to construct an educational program independent of preconceived and preestablished CA and IQ categories by structuring the substance in a developmental sequence consistent with the maturational level of the children.

It may be necessary to categorize children in some effective way so that specificity in treatment and management can be achieved. Thus, categories can be viewed as emanating from an assessment of process as opposed to an identifiable, universal product. In educational terms, this would mean categorizing children according to how they perform within the context of a developmentally organized, relevant curriculum. However, the development of such a system must follow the development of the curriculum.

The curriculum to be developed by this project is intended for use with the children currently labeled trainable mentally retarded. Although definitions of mental retardation abound (Rothstein, 1971), and criteria for the subgroup labeled trainable vary widely, the American Association of Mental Retardation's definition and IQ limits (30 to 50) appear to be most commonly accepted. By the AAMD criteria, trainable children are those evincing a moderate degree of mental retardation, i.e., three to four standard deviations below the mean. Since the latter term has, at this time, few noxious or pejorative connotations, this paper will consistently adopt the terminology "moderately mentally retarded" to refer to the target population.

This paper will set forth the parameters delimiting the development of such a curriculum. First, it will explore the behavioral attributes of the target population. Second, it will review all available research relevant to the education of moderately retarded children. This review builds on the conclusions of earlier reviews in this area (Denny, 1963; Spradlin and Girardeau, 1966; Evans and Apfel, 1968). Finally, the available information will be synthesized, and implications for curriculum development will be derived.

Behavioral Characteristics of Moderately Retarded Children

A vital precursor of curriculum development is the identification of the needs of the target population; in this case, it is the moderately retarded. The designation of valid curriculum and educational objectives requires a thorough understanding of the problems confronted by the mature retarded individual and the skills necessary to deal effectively with these problems. The moderately retarded have been described as persons "whose disabilities are such that they are incapable of meaningful achievement in traditional academic subjects but also, nevertheless, are capable of profiting from programs of training in self-care, social and simple jobs or vocational skills" (Heber, 1969, p. 96). Rosenzweig and Long (1960) use the term "semi-dependent" to describe the moderately retarded youngster. Among the characteristics they focus on in selecting this term are a presumed lack of judgment and reasoning. Furthermore, it is said that:

> They will remain socially inadequate although an educational regimen instituted early and continued almost to the adult years may help them to live fuller and richer lives.

Assigning characteristics to an individual has often led to stereotyping anyone who displays one or more of those characteristics. An individual so labeled is likely to be assigned an education or training program designed to correspond to the assumed characteristics of that group, rather than one tailored to his own real needs. Clinical impressions and anecdotal accounts have often been used as the basis for identifying characteristics of moderately retarded individuals. This has led to descriptions (and, subsequently, curricula) emphasizing the individual's presumed limitations.

In order to obtain a more accurate perspective of the behavioral characteristics of moderately retarded individuals, the Curriculum Center conducted a comprehensive review of the literature (the body of this paper) and conducted some specific research. The primary research project (Bepko, Reiss, and Alter, 1973) involved a questionnaire. Professionals, working throughout the country with moderately retarded adolescents and adults, were asked to identify the major problems facing their clients. The responses were strikingly similar to those of an earlier survey (Curriculum Center, 1969) which had focused on mildly adolescents and adults. The major needs were seen to be in social behaviors although the analysis did indicate some particular needs in the areas of motor skills and communication skills.

Additional analyses based on data collected in an institutional setting and in a community setting are expected to provide further detail. This preliminary project certainly suggests that the Social Learning Curriculum can provide an appropriate framework for a curriculum for moderately retarded individuals.

It is expected, however, that although needs may be similar, there are relevant differences in learning characteristics (not necessarily IQ-related). Additional research and the review of literature will clarify aspects of the curriculum that must be modified so that the needs of moderately retarded individuals can best be met.

Review of Research

> The evidence...sugests that the behavior of mentally retarded subjects follows the same general laws as does that of other human and subhuman subjects, but that there are some behavioral differences which are probably related to mental retardation, brain damage, or both conditions. Extinction appears to take a longer time in subjects of low mental ability and to be less closely related to the schedule of reinforcement under which the response was acquired; variability from session to session may be more extreme than in other subjects, and it may be more difficult to establish secondary reinforcers with severely retarded subjects (Robinson and Robinson, 1965, p. 332)

A review of the literature revealed numerous studies comparing the learning characteristics of the moderately retarded to those of normal children and higher functioning retardates; other studies compared subgroups of moderately retarded individuals (i.e., Down's Syndrome). However, in reviewing the research one must be aware that those classified as mentally deficient "include a wide range of behavior patterns, mental abilities, physical conditions and social competencies..." (Goldberg and Rooke, 1967, p. 113).

Prescribing a program according to a supposed stereotype has occurred most commonly in the case of children with Down's Syndrome, who represent a sizable minority group of all retarded children, but a large percentage of the moderately retarded. The physical characteristics of these children, which guarantees them a high degree of visibility, have most frequently made them the subjects of attempts to isolate special behavioral characteristics useful in developing special educational programs for mongoloids. However, the weight of the evidence to be discussed in this chapter appears to require the abandonment of this approach because there is no reliable evidence to support such separatism.

There have been three recent major reviews of behavioral studies of Down's Syndrome children (Zisk and Bialer, 1967; Belmont, 1971; Johnson and Olley, 1971). Each has indicated that although there may be some systematic differences between mongoloid and nonmongoloid retardates, these differences are insufficient to warrant the development of special programs.

Zisk and Bialer (1967) reviewed the research on speech problems of mongoloids. Four areas were considered: symbolization, articulation, rhythm, and phonation. They concluded that there was little evidence to warrant the continued study of the speech development of mongoloids as a separate group. It was pointed out that there are only two areas (articulation and phonation) in which systematic differences occur. However, these appear to be structurally based and are therefore of little value for program development.

Johnson and Olley (1971) reviewed 27 studies comparing mongoloid with nonmongoloid retardates in four areas. Studies of mental abilities give some indication of a slightly lower verbal ability among mongoloids, although studies of learning and conditioning report no differences between the groups. In the area of sensory processes, there is some indication that tactual processes may be inferior. Finally, reaction times of mongoloids are reported to be slower than those of nonmongoloid retardates, but activation is similar to that of normals. Johnson and Olley (1971) conclude that the studies they reviewed indicate more similarities than differences between mongoloid and nonmongoloid subjects.

A later review by Belmont (1971) considers a broader range of 54 studies of the behaviors of mongoloids. Among his conclusions were that mongoloids demonstrate disturbed or disturbing behaviors less often than their non-mongloid peers, mongoloids are more socially than intellectually mature (based on Vineland scores of community residents up to age 16), and that there is no support for the "tradition of extraordinary musicality and rhythm in mongoloids," (Belmont, 1971, p. 73). Furthermore, the author points out that there is no theoretical or research evidence to support any relationship between behavioral patterns and the cytogenetic characteristics of mongoloids.

A detailed analysis of studies of perceptual and associative skills revealed that, "Perceptual and associative processing varies within the mongoloid population, and mongoloids are more or less capable than other retardates, depending upon which input-output channels are being considered." (Belmont, 1971, p. 74) For input channels, the visual system was found to be stronger than either the auditory or tactile. Mongoloids are able to perform visual-motor, visual-vocal, and auditory-motor integration more effectively than auditory-vocal integration. For output channels, mongoloids appear to be more effective in motor than in vocal encoding. Belmont (1971) concludes that visual-motor may be the mongoloids' strongest sensory channel and, indeed, this system may be stronger in mongoloids than in nonmongoloid retardates.

Byck (1968) hypothesized inherent cognitive differences between familial and mongoloid groups within the moderately retarded population. These differences are assumed to be a function of the differential effectiveness of reward situations on cognitive performance. Two reward variables, tangible and intangible, were used with a modified version of the marble sorting task employed by Kounin and Zigler. The reward conditions did not result in differential performance for the diagnostic groups. Mongoloids demonstrated better performance under the tangible reward situation, whereas familials performed better in the intangible reward condition. Byck concluded that some cognitive differences do exist between familial and mongoloid retardates as manifested by differential reward effectiveness. However, the results did not support his major hypothesis, and the reliability of the marble sorting task as an index of reinforcer effectiveness is questionable (Reiss, 1970).

Jacoby (1971) examined differences between mongoloid and nonmongoloid moderately retarded children on tasks of intentional and incidental learning. The results indicated significant differences between the two groups on both kinds of learning. Jacoby strongly suggested the need for further research in this area and recommended careful consideration of possible differences in teaching technique and program planning.

Systematic relationships among the number of physical stigmata exhibited by the mongoloid, their intellectual functioning, and performance on the Wheatridge Evaluation Checklist (WEC) were investigated by Brown (1971). Among a sample of 47 institutionalized mongoloids, he found that IQ decreased as the number of physical stigmata increased. A negative correlation was also obtained between mongoloid intelligence and age. Older mongoloids displayed more physical stigmata, and mongoloids with IQs near the trainable range performed best on WEC items. No significant relationships appeared between either sex or physical stigmata and performance.

Scheffelin (1968a) suggests that acquisition of responses by mongoloid children during paired associate learning can be facilitated by a visual-motor rather than auditory-vocal modality of stimulus presentation. This level of difficulty manifested with the auditory-vocal modality may explain, in part, the slow development of language in Down's Syndrome children because language development can be considered as a sequence of auditory-vocal tasks (Scheffelin, 1968b).

Wesner (1971) investigated the paired associate learning of mongoloids and normal children of similar MA under conditions of arousal and nonarousal. He found that both groups learned faster under arousal conditions. There were no significant differences, however, between the groups in level of performance or increase in learning under arousal compared with nonarousal conditions.

Although this kind of information may be useful in developing individual remedial prescriptions, it seems to lack sufficient generalizability to generate curriculum decisions. In this regard, it may be contrasted with the work of Buddenhagen (1971) which, although performed with mongoloid subjects, is intended to be applicable to all children in need of language instruction. Indeed, Evans and Hampson (1969, p. 780) point out that there is no unique linguistic syndrome peculiar to mongolism; "further research attempting to prove such a relationship...is likely to prove unrewarding."

Others who have unsuccessfully attempted to discover differences between mongoloids and nonmongoloid retardates include Grossberg (1967), Moore et al. (1968), Peters (1970), Glousky (1972), and Dodd (1972). Fredericks (1969) divided 72 mongoloids, between the ages of 7 and 12, into three training groups: Dolman-Delacato patterning, behavior modification, motor training, and unspecified control group. Subjects in the behavior modification program attained significantly higher change scores on both the Dolman-Delacato Profile and the Lincoln Oseretsky Test than subjects of either of the two other groups. It appears best to agree with those who have concluded that the evidence does not warrant any form of special programming for mongoloids as a subgroup of the mentally retarded. It also suggests that there is little likelihood of identifying any significant programming needs on the basis of medically defined criteria.

A. Learning

1. Reinforcement. Research in the area of reinforcement procedures with the mentally retarded has focused on numerous reward variables. These include primary and secondary reinforcement, social reinforcement, positive and negative reinforcement, quantity and quality of reinforcement, delay versus immediacy of reinforcement, and schedules of reinforcement. Although the studies have employed subjects of all ages in all intellectual ranges, no really systematic analysis of all reinforcement variables under adequately controlled conditions has been undertaken (Reiss, 1971). The occurrence of many sets of conflicting results attest to this fact. This is not to say that there has been no meaningful research done in the field or that consistent results do not exist in the literature. On the contrary, much valuable research and many reliable findings have emerged. Nevertheless, tighter controls, larger numbers of subjects, and cleaner designs are needed to substantiate these findings. The following discussion attempts both to synthesize and highlight the findings that have been supported most consistently.

Edible, manipulatable, and social rewards have all been used effectively in varying amounts, the only qualification being that the reward be considered as such by the subject and not be merely a projected value of the experimenter (Reiss, 1970). In addition, when using varying amounts of reward, it must be made certain that the difference in reward value is perceived as a significant difference by the subject (Cromwell, 1963). Although the quantity of reward does affect the vigor of performance of a learned response, it does not seem to affect the rate of learning. Moreover, variables such as the previous reward history, deprivation schedule novelty of the task, and IQ all play a vital role in the effect of a particular amount of reward (Baumeister and Ward, 1967; Siegel, Williams and Forman, 1967; Ellis, 1962; Stevenson and Knights, 1961).

The more immediately a reward is given after the response, the faster will be the learning of that response. Although retardates within the educable range are comparable to normals in the way they are affected by any length of delay, retardates below the educable range are more detrimentally affected by delay than both normals and educable retardates (Jacob, 1950; Jetherington, Ross and Pick, 1964).

Both primary and secondary reinforcers have been effective in producing and maintaining learning, the effects varying with the individual reward preferences of the subjects involved. Although there is some evidence that lower-level retardates have greater difficulty learning with only secondary reinforcements, this has not been consistently demonstrated in other studies (Watson, Lawson, and Sanders, 1965; Hollis, 1965; Girardeau and Spradlin, 1964). Secondary rewards have been used effectively with the perception of their reinforcing properties varying from subject to subject. Some of the secondary reinforcers used have included toys, crayons, paints, cigarettes, watching TV, listening to music, paper square tokens, the sound of a bell, and money (Ellis, 1962; Baumeister and Ward, 1967). It has been shown that lower MA subjects prefer coins to bills, whereas higher MA subjects prefer larger denominations. In addition, silver coins are more desirable as reward than pennies (Blount, 1969). Social reinforcement appears to be more effective with retardates than with normals, primarily owing to the social deprivation histories of the retardates. The position of reinforcers in the institutionalized mental retardate's hierarchy is determined largely by environmental events occurring within the institution and by his preinstitutional experiences. Institutionalized retardates suffer relatively greater deprivation of adult approval and affection and are, therefore, more strongly motivated to secure both (Zigler, Butterfield, and Capobianco, 1970).

The findings on the comparative effectiveness of social reinforcement and primary reinforcement are mixed. Some studies show social reinforcement to be more effective. Ohther studies show a shift in effectiveness after making trials, with primary reinforcers being more effective during initial acquisition of learning and social reinforcers being more effective, in maintaining learning at later stages. Still another study shows no difference in the effectiveness of the two. The findings on the comparative effects of social reinforcement and other secondary reinforcements are also mixed. It appears that Locke (1969a) is justified in stating "that the reinforcing attributes of such (social) consequences are neither uniform nor universal."

Sensitivity to social reinforcement has been shown to be, at least in part, a function of MA (Stevenson and Snyder, 1960), and sex of both experimenter and subject (Stevenson and Knight, 1962). In addition, the subject's perception of the intelligence and social status of the reinforcing agent has been shown to be an important variable affecting the effectiveness of the dispensed reinforcement. Normal peers were found to be more effective than mental retardate peers as sources of reinforcement for both normals and retarded subjects (Terrel and Stevenson, 1965).

The use of punishment or negative reinforcement techniques with the retarded has been limited, owing to the feeling that such procedures are unethical, nonprofessional, and inhumane. When used, they are often a last resort technique after all other techniques have failed. For this reason, they are used mostly with severely and profoundly retarded individuals, who have failed to respond to other procedures. Although it has been stated (Robinson and Robinson, 1965) that the results of punishment arouse fear and anxiety, which decrease adaptability and flexibility, and are less predictable and permanent than the results of positive reinforcement, punishment has shown to be effective in eliciting behavior change.

Punishment appears to be most effective in treating single, specific behaviors that occur without too much variation in frequency or type, and that do not usually involve direct interaction with other individuals (e.g., head banging). Single specific behaviors that do occur with variation in frequency and/or intensity, and that do involve direct interaction with others, require longer treatment periods and are not usually completely eliminated. Complex behaviors or general misbehavior consisting of a wide variety of inappropriate behaviors show the least improvement with punishment procedures (Gardner, 1969).

Moderately retarded individuals have been shown to be sensitive to the four basic intermittent reinforcement schedules - fixed ratio, fixed interval, variable ratio, and variable interval - and to the two basic nonintermittent schedules - continuous reinforcement and extinction (Ellis, Barnett, and Pryer, 1960; Hunt, Fizburgh, and Fitzhugh, 1968). The continuous reinforcement schedule serves to establish and shape behavior, whereas the intermittent schedules are more effective in maintaining the behavior and allowing it to persist in the face of extinction (Spradlin, 1962; Hopkins, 1968).

Variable schedules have been found to elicit higher response rates than fixed schedules. Low ratio schedules have been found to elicit higher, more stable response rates than high ratio schedules (Orlando and Bijou, 1960). Fixed ratio schedules seem to be very powerful controlling schedules not affected greatly by variations in reward magnitude, whereas fixed interval schedules appear to elicit low rates of response in many cases (Ellis, Barnett, and Pryer, 1960; Orlando and Bijou, 1960; Spradlin and Girardeau, 1966).

Evidence indicates that retarded subjects are also sensitive to multiple schedules, which may actually produce more precise control over response rates than simple schedules (Orlando and Bijou, 1960; Bijou and Orlando, 1961).

Task instructions and exposure to previous schedules are factors affecting rate of response in a current reinforcement schedule (Headrick, 1963). MA and IQ are also variables that have been associated with differential rates of response in schedule shifts. Subjects with higher MAs, IQs, and CAs were found to respond with higher rates than lower IQ, MA, and CA subjects when shifted from a fixed interval schedule to a fixed ratio schedule (Ellis, Barnett, and Pryer, 1960).

It is clear from the above that reinforcers have widely varying effects upon learning and performance and that these effects are closely related to a host of subject and task variables. Although the research reviewed here has identified a few general principles, the procedures derived from behavioral psychology, which focus on individual presumptions of tasks and reinforcers (Sulzer and Mayer, 1972; Neisworth and Smith, 1971; Greene, 1966; Lovitt, 1970), are of greater value.

Discrimination Learning. All learning requires a person to differentiate what he sees, hears, or touches. For example, in a social setting, the child attends to certain physical aspects of the people present: the sound of the person's voice, body shape, facial features, and clothing. Using these differentiating variables the child learns to discriminate one person from another (i.e., man/woman, mom/dad). It is essential then that the child learn to detect the relevant aspects of a situation before he can respond appropriately to the situation. Once the child can identify the relevant from the irrelevant, he must learn to transfer this knowledge to other situations.

It is often claimed that moderately retarded individuals tend to learn more slowly and retain less information than other children. Ellis (1963) has indicated that there exists in the trainable mentally retarded a short-term memory deficit which contributes to their retention inadequacy. He feels that there is a defective stimulus trace that causes the short-term retention inadequacies, even though the long-term memory processes may be intact. House and Zeaman (1963) have attributed the learning inadequacies of the moderately retarded to their inability to discriminate relevant aspects of a situation from the irrelevant. However, Baumeister (1970) suggests another point of view: "the learning deficiency of mildly and moderately retarded persons is task-special and related to only certain aspects of the learning situation...and under certain conditions the learning and retention of retardates are quite adequate-comparable, in fact to the normal" (Baumeister, 1970, p. 182).

Heal, Ross, and Sanders (1966) investigated discrimination learning and original learning differences among moderately retarded and normal children. Thirty-six institutionalized and 36 normal subjects, matched on MA, were administered on original learning and three reversal tasks: negative reversal, positive reversal, and standard reversal. The two groups did not significantly differ in original learning. However, the retarded subjects were inferior in overall reversal learning. The standard reversal task, which required approaching a previously negative cue and avoiding a previously positive cue, was found to be significantly more difficult than the negative reversal and positive reversal tasks, which utilized novel cues. The results, according to the author, suggested two deficits among the retarded population: an inability to inhibit previously acquired responses and a susceptibility to be distracted by novel stimuli.

Lu (1966) investigated preferences for schematic representation of the human face to other visual stimuli. An additional question was whether stimulus preference could be changed by conditioning and, if so, could conditioning effects be generalized to the more complex task of discrimination learning. Ten retardates with MAs under one year and 10 normal infants were randomly divided into groups of five each. A pre- and posttest, consisting of six visual stimuli, was administered to all groups. A conditioning procedure (red light followed by food) was used with the experimental groups. Fixation time was recorded. Subjects were tested for learning with other stimuli using red as a secondary reinforcer. The previous findings of stimulus preference by infants were supported for the normal subjects and, to a less degree, the retardates. Conditioning procedure did change the stimulus preference for the experimental groups in that the face was no longer significantly preferred to the color red. However, neither the normal or retarded experimental subjects showed a significant preference for red, calling into question the generalization of the conditioning effects.

Adler (1970) replicated previous studies in comparing normal and retarded institutionalized children on a task requiring the drawing of fruit trees associated with certain colors. As in earlier studies, retarded subjects responded in a similar manner as nonretarded children. However, the normal subjects manifested greater response strength. Adler suggested this might be because of associational defects and attentional deficits of the retarded subjects.

Hagen (1971) investigated the selective attention of normals and retardates (IQ 46.2-79.4) and found that the retardates showed less ability to attend to relevant aspects of the task (recall of a central and an incidental picture on six stimuli cards) than normals of the same MA. However, the finding applied only to institutionalized retardates.

Whitman (1970) attempted to assess the validity of Scott's learning developmental model through the use of novel and nonnovel discrimination solutions for simultaneous matching-to-sample and successive discrimination learning tasks. Simultaneous discrimination tasks were most often learned via a cue selection solution, whereas successive discrimination tasks were learned utilizing cue position patterning. These results were consistent with Spence's (1936) theory and similar to results reported by Lipsitt (1961) for normal children. House (1970) studied the facilitative and decremental effects of redundant information on the discrimination learning of moderately retarded, institutionalized subjects. Her results confirmed previous findings that two different stimuli per card produces slower learning than one-item cards in a two-choice discrimination task. House also reported that performance decreases with an increase in the number of relevant card differences. Limited short-term memory capacity and a lack of stimulus integration (in this case, the spatial contiguity of stimuli) were postulated as possible explanations for the decremental effects indicated.

The effects of modality of stimulus presentation and "learning to learn" were investigated by Wall (1966). Forty-eight institutionalized moderately retarded subjects were randomly placed in three experimental groups. For the first group, the stimulus was visual; for the second, tactile; and for the third, visual-tactile. Each subject was presented two two-choice discrimination tasks representing two levels of difficulty with the sequence and value of the stimulus counter-balanced. No significant differences obtained between subjects. However, a significant positive relationship between IQ and performance and several trends did appear in the data. The trends indicated that performance was highest learning tasks. Scott's model indicates that developmental level (mental age) is an index of the amount of universally taught material the individual has learned and IQ is a measure of the present rate of learning ability. One hundred and twenty-eight subjects were divided into eight cells. The subjects were selected from an institution for the retarded, a nursery school, and public school classes. Similar mean MAs and IQs were obtained for 64 subjects of each sex, condition, and cell. The subjects were administered discrimination learning tasks under novel and nonnovel conditions using the Wisconsin General Testing Apparatus (WGAT). The results did not support the model; none of the six independent variables (MA, IQ, sex, institutionalization, condition, experience on previous studies) significantly affected discrimination learning.

The critical role of attention in discrimination learning was emphasized by Bilsky and Heal (1969). Using 48 institutionalized residents, ($\bar{X}$CA-24.10, $\bar{X}$IQ-47.9), they investigated factors of cue novelty and training levels as possible facilitators of retardate's discrimination performance, specifically as they affect ability to shift attention among dimensions in the solution of discrimination problems. Several different color-form combinations were used as stimuli. The procedure consisted of pretests, pretraining, and shift problems with alternative solutions. It was found that subjects in the novelty condition made more extradimensional shifts than subjects in the nonnovel condition. The authors suggested that cue novelty is an important influence on subjects' attention to abstract properties of stimuli and that procedures influencing the direction and duration of attention may ameliorate learning deficits. In a related study, Heal, Dickerson, and Mankinen (1968) reported that moderately retarded subjects tend to adopt different on the visual-tactile tasks and that the visual groups appeared superior to the tactile group.

Cupp (1968) investigated the effects of several fixed-ratio reinforcement schedules on the discrimination learning of 40 moderately and mildly retarded subjects. The results indicated it was possible to maintain a high rate of performance over a broad range of schedules ranging from knowledge of results on a 1-1 ratio to physical reinforcement on a 1-10 ratio. The mildly retarded performed consistently better than the moderately retarded. However, the acquisition slope of the moderately retarded group quickly approached that of the mildly retarded when given the opportunity to earn tokens that could be exchanged for physical reinforcers.

In summary, it appears that a combination of techniques that pace learning control, relevant stimulus dimensions, and specify reinforcement contingencies can significantly improve the performance of moderately retarded individuals on discrimination tasks.

Information processing

Turnure (1970) conducted three studies to assess the orienting responses of moderately retarded subjects. He found that retarded individuals are not more distractible that the nonretarded, although they may appear to be as a result of age-inappropriateness of the task. The presence of an adult experimenter during learning resulted in an increase in glancing, which supported the hypothesis that nontask orienting by retardates reflects an information-seeking strategy rather than vacuous orienting or generalized distractibility. Turnure cautions that these results are generalizable only to institutionalized famililial retardates and is restricted to overt orienting responses. Das and Bower (1971) investigated the conditioning and habituation of orienting responses to meaningful verbal stimuli with 26 normal subjects and 25 retarded subjects (IQ 40-65). The researchers measured GSR to signal words (man always followed box) presented in a 30-minute taped presentation of a series of six familiar words. Subjects were required to press a button when the signal words were heard - the signal word Man always followed the warning signal Box. The results indicated that the normal subjects were more attentive to the warning signal; the habituation rate for both groups, however, was virtually the same.

Herriot and Cox (1971) studied the subjective clustering and subjective organization of verbal items by mongoloid and nonmongoloid moderately retarded subjects. His results indicated that clustering and subjective organization occur when the stimulus presentation is pictorial and simultaneous, when the number of stimuli items is few, and when the names of the stimulus items are known to the individual. There was no significant relationship between subjective organization and clustering; thus, they seem to reflect different processes. Subjective organization seems to be a function of temporal sequencing of auditory stimuli and recall of previously sequenced stimuli, whereas clustering occurs as a function of hierarchical organization.

Olson (1971) investigated the amount of information extracted and utilized from a visual experience by mildly and moderately retarded subjects. The results indicated that the degree of retardation is closely related to information-processing ability. Cues pertaining to shape are most easily processed, and those pertaining to size, the most difficult. Cues are not processed independently of each other, and some are likely to be consistently confused with one another. Milgram and Riedel (1969) reported that verbal context cues are more effective in facilitating paired-associate learning than combined visual and verbal cues. Milgram (1968a) found that verbal mediation facilitates paired-associate learning; facilitation varies with the degree of explicitness in presentation of the verbal connections and the extent of verbal production deficiencies of the subjects (Milgram, 1968b).

In a study using 40 moderately retarded subjects, Silkowitz (1970) investigated the process of transferring stimulus control from visual stimuli (simple geometric forms) to corresponding verbal instructions for the purpose of developing a form discrimination program. He paired verbal commands with corresponding verbal discrimination stimuli, then faded the visual stimuli. The results of the study indicated that 1) a program can be developed for transferring visual stimuli to verbal stimuli, 2) systematically programmed materials are more effective than nonprogrammed materials, and 3) fading is less critical in establishing gross discrimination than fine discrimination.

Response acquisition during discrimination learning was facilitated by aversive stimulation under certain conditions (Massey and Insalaco, 1969). When aversive stimulation serves as a feedback cue following an incorrect response, it tends to enhance acquisition of the correct response. Simultaneous feedback showed greater facilitation of response acquisition during paired-associate learning than delayed feedback, whereas monetary incentives were not effective facilitators of response acquisition (Ward and Baumeister, 1971).

Bonsett, Rose, and Kelly (1969) compared the reaction times of normal and moderately retarded subjects. They reported that the reaction time of normals is significantly faster and less variable than the reaction time of moderately retarded subjects. Although the retardates do not comprise a homogeneous group with respect to reaction time, they tend to respond at a slower average rate, perhaps as a function of inability to maintain attention to the task at hand. Gordon and Bush (1968) investigated the effects of varying stimulus duration (1/8, 1/2, and 2 1/2 sec.) while holding stimulus intensity constant in a delayed response experiment with 30 moderately retarded subjects. The results indicated decreased recall with longer delay and increased recall with greater stimulus duration. The study supported the hypothesis that duration of the visual stimulus does affect retention when it is paired with proper intensity.

Retention of paired-associate learning among mildly retarded, moderately retarded, and normal subjects was investigated by Haywood and Heal (1968). No differences were found in either training or retention performance between groups. However, the individuals IQ groups who made more correct responses during acquisition retained the learned associations best and forgot them at a slower rate. Hinshaw and Heal (1968) investigated the retention of moderately retarded individuals when stimuli are presented cross-modally or like-modally. Contrary to the findings of O'Connor and Hermelin (1961), like-modality was superior to cross-modality recognition.

Moffit and Coates (1969) investigated the effects of IQ and MA and their interaction on problem-solving strategies and performance of moderately retarded subjects. IQ was found to be related to performance and strategy, whereas MA was not. The authors pointed to the necessity of considering IQ-associated individual differences in performance within a context of task and strategy. Similar to the results reported earlier for paired-associate learning and discrimination learning, verbal mediation was found to facilitate certain kinds of problem solving in moderately retarded individuals.

The studies reviewed in this section indicate that moderately retarded individuals do not seem to use information-processing skills to the same extent as do individuals of normal IQ. However, they have demonstrated an ability to acquire such skills (particularly as problem-solving strategies). Furthermore, such acqusition may be facilitated by the systematic introduction of verbal mediators. The inductive teaching method, which is a feature of the Social Learning Curriculum, offers a promising approach to the teaching of a problem-solving strategy.

Academic Learning. The inability to master reading and arithmetic has often been cited as a major characteristic of moderately retarded individuals (Gunzberg, 1964). As a result, most curriculum guides have strenuously urged teachers to avoid instruction in these areas (Evans and Apfel, 1968). The acceptance of this dogma has limited research efforts (although not always classroom efforts). In the area of reading, the most notable research can be found in a study by Sue Warren (1963), which examined the academic achievement of 177 moderately retarded children having five or more years of academic instruction. Her results indicated that, even with the investment of a great deal of time by both teachers and students, there was too little evidence of useful achievement to justify this kind of programming. Warren did suggest, however, that it would be desirable to develop a program that could efficiently teach a selected set of useful concepts.

Bijou (1969), systematically applying behavioral principles to the teaching of reading, developed the Edmark Program to teach a basic vocabulary of 150 words. Other reading programs planned for use with moderately retarded children include the Peabody Robus Reading Program (Woodcock, 1967), Initial Teaching Alphabet (Evans and Apfel, 1968), and SEFA (Gunzburg, 1969).

It seems that in reading, perhaps more so than in any other curriculum area, the problem of teaching to a stereotype is prominent. Teachers appear to be pressed to either teach reading to all students or to none. Clearly, teachers need help in finding ways of teaching children how to read, that allow each student to progress to the full extent of his abilities.

Somewhat more research has focused on mathematical learning. Peterson (1967) administered arithmetic tests in eight categories to mildly and moderately mentally retarded children ages seven, eight, and nine to determine selected mathematical skills. Mathematical skills of mildly retarded subjects were significantly greater than those of moderately retarded subjects on the total test and all subtests. There exists a notable relationship between chronological age and mathematical skill which, in turn, can be attributed to mental age for both groups. A significant relationship was also found between the number of years in school and performance on the various subtests administered for mildly, but not for moderately. The study did find that both the mildly and moderately retarded possessed identifiable mathematical skills and concepts, such as mathematical vocabulary, number symbols, cardinal and ordinal numbers, and money value.

Armstrong (1969) studied the relative effects on mathematical learning of moderately retarded subjects of two kinds of instructional materials - manipulative (concrete) and nonmanipulative (incorporating pictoral and symbolic modes of representation). Two instructional procedures were utilized: act repetition and varied repetition (an instructional presentation that does not repeat exactly the previous presentation, but teaches the same concept). Four areas of arithmetic (numerical quantity association, conservation of quantity, numerical identification, and sequential counting) were taught for approximately one hour daily for a period of three weeks. Comparisons of gain scores showed that only numerical quantity association was significantly affected more by manipulative than by nonmanipulative materials. An analysis of the differential effects of the instructional procedures indicated that varied repetition was better coupled with nonmanipulative materials, whereas exact repetition was better coupled with manipulative materials.

Dalton, Rubino, and Hislop (1973) demonstrated the effectiveness of a token economy over a nontoken economy in the arithmetic and language performance of Down's Syndrome children aged 6 to 14 (IQ = 30-64). Both groups were scheduled for half-day instructional sessions three times a week over an eight-week period. DISTAR arithmetic and language materials were presented during two nonconsecutive 30-minute sessions daily. One group of seven children received token reinforcement for correct responses and displayed significant improvement both in language and arithmetic as measured by pre- and posttest gain scores. A second group of six subjects matched an IQ, who had received verbal praise for correct responses to the same materials, failed to improve in arithmetic, but showed significant gains in language. The DISTAR arithmetic program was shown to be especially enhanced when instruction was supported by a token economy. Retest scores, one year later, revealed that the token economy group maintained gains both in arithmetic and language, whereas the language performance of the non-token group showed a signficant decline.

Bellamy and Brown (1972) conducted a study of the learning of four moderately retarded subjects of a sequence of eight arithmetic skills: labeling printed numerals, writing numerals from verbal cues, counting quantities of lines and reporting the total verbally, drawing quantities of lines corresponding to printed materials, counting quantities of lines and writing the total, preaddition exercises (two), and simple addition problems (all tasks not exceeding the quantity or sum of 10). The four subjects ranged in age from 13-0 to 20-4 and IQ from 35 to 40. The teaching program was conducted as a regularly scheduled group activity during the same time other students were engaged in other number activities with a teacher aide. The goal of the instructional program was not primarily to teach sense or a concept of addition, but rather to develop a program that would minimize the possibility of failure. Baseline measures of performance were taken on all tasks except the two preaddition exercises. The initial instructional material for each task was held constant for both baseline and teaching conditions. Since all subjects responded perfectly to the tasks requiring labeling numerals from 1-10 in sequence and rote counting, no teaching procedures were employed for these tasks. Materials used in the instructional program included index cards for numeral and quantity recognition and quantity slips for addition. Edibles, including a variety of cereals and candies, as well as praise and applause were used immediately to reinforce correct responses. The entire program required 268 trials and 130 hours of instructional time. Each of the four subjects made 10 discrete responses to the instructional materials during each trial. The number of responses could range from 0 to 40. Attaining this criterion with each task was followed by the introduction of the next tasks in the sequence. The initial trials of each teaching Phase were conducted under baseline conditions. During baseline period (trials 1-2) the four subjects averaged as high as 35 correct responses on counting quantities of lines and reporting the total verbally to 0 correct responses on the addition tasks. In the actual instructional program the attainment of the criterion (40 correct responses) ranged from a low of 9 trials on one of the preaddition exercises to 76 trials on writing numerals from verbal cues (after the baseline period).

The addition learned during the previous year was tested and reviewed prior to the start of a continuation study by Bellamy, Greiner, and Laffin (1972). Each of the four trainables met the criterion of 2 consecutive trials in which 98 percent accuracy was maintained on 25 addition problems after a summer vacation of 10 weeks. Instruction in the continuation study included a sequence of intermediate arithmetic tasks: identifying the numeral following each numeral, counting on from each numeral, addition, counting backwards, identifying the numeral proceeding each numeral, counting down from each numeral, subtraction, and working mixed addition and subtraction problems (all tasks not exceeding the quantity of 10). Similar materials and the same reinforcement techniques were used for correct responses. Two baseline trials were conducted in tasks involving verbal responses, and three baseline trials were conducted in tasks requiring the working of problems prior to the instructional period. The instructional program was completed in 357 trials during nine months of school attendance. Students progressed through the program by meeting a defined performance criterion (3 consecutive trials in which all students responded perfectly) on each task. Each of the four subjects made 10 discrete responses to the instructional materials involving identifying numerals and counting (verbal responses) and 15 discrete responses involving addition and subtraction problems. Thus, the number of responses ranged from 0 to 40 and 0 to 60, respectively. During the baseline period of two consecutive trials, the four subjects averaged as high as 30 correct responses on addition and as low as 4.6 on subtraction. In the actual instructional program, the attainment of the criterion (60 correct responses) ranged from a low of 21 on mixed addition and subtraction to a high of 31 on subtraction by counting down from the minuend. On the criterion of 40 correct responses, the range was from a low of 23 on counting down from each numeral to a high of 63 on counting on from each numeral.

Bellamy and Laffin (1972) conducted a demonstration program to show the feasibility of first teaching academic counting skills and then applying these skills to the tasks of counting various amounts of money with trainables. The five subjects ranged in age from 13-3 to 20-6 and IQ from 46-49. The teaching program was conducted in a group setting in three phases: a) baseline assessment, b) teaching the actual sequence of tasks, and c) applied skills associated with counting money alternately tested and taught. The instructional sequence included teaching counting to 100 by the rote method, teaching counting by 5's to 100, teaching counting by

10's to 100, teaching counting by 25's to 100, teaching labeling price-cards (1¢ to $1.00) and teaching identifying coins. Two baseline trials were conducted in which the subjects responded to all instructional cues without either assistance or reinforcement. The teaching sequence consisted of the same instructional cues. Reinforcement was followed by compliments by the teacher and applause by other subjects. Each subject also received a specific number of points on a pointcard for a correct response on the tasks under instruction. The instructional program required 206 trials and approximately 110 hours of instructional time during six months of school attendance. Subjects advanced through the program by attaining a defined criterion performance (two consecutive perfect trials in which all subjects responded perfectly to all instructional cues) on each task in the sequence. The objectives of the instructional program were attained. The five students learned to count out from the set of coins any amount of change under $1.00.

Although almost every curriculum guide for the moderately retarded indicates the need for mathematical learning, no consistent position has been established. The research studies, although sparse, seem to indicate certain trends that might guide the establishment of a position. Moderately retarded individuals can acquire identifiable number concepts and skills. Concrete manipulative instructional materials appear to be most appropriate to teaching these number skills and concepts. A verbal interaction instructional model (such as DISTAR), when supported by token reinforcement, seems to increase arithmetic achievement. A cumulative sequential instructional program of arithmetic skills with a consistent set of defined instructional materials and a provision for differential reinforcement can positively affect both retention and transfer of training (e.g., the application of counting money) for the moderately retarded. The scope and sequence of these skills needs to be clarified as a preliminary to further development in this area.

Summary

The literature reviewed in this section reveals a lack of systematic research concerning the learning and performance of moderately retarded children. There seems to be a rather random selection of research topics dealing with this population both across the various learning dimensions and within the dimensions themselves. It is difficult to find evidence of a comprehensive attempt to delineate learning patterns of the moderately retarded. What do exist are pieces of literature related to detailed and prescribed research interests. This, of course, is acceptable because "good" research requires ingenious experimental investigations of defined purpose and narrow limitation. Conspicuous by its absence, however, is a framework for this research - a framework that would both accomodate the existing evidence and generate nonrandom, purposeful investigations into areas of priority interest. However, the research did support our major assumption that the moderately retarded are capable of learning, regardless of variables such as environment or physical abnormalities. What was evident was that there are factors that impede the degree of learning, but these impediments can be ameliorated, (e.g., better institutional facilities, cue novelty to increase duration of attention, visual presentation of stimuli, appropriateness of task, awareness of child's reinforcement needs). What is needed to ameliorate these learning impediments is a systematic instructional program.

This section has identified three basic features of such a program:

1. clear identification of the specific skill or concept to be learned,
2. specification of reinforcement strategies,
3. provision of a systematic problem-solving strategy.

Elements such as these are to be found in techniques derived from experimental behavior analysis as well as in the Social Learning Curriculum's inductive teaching method. Characteristics of the learner and of the task must guide the selection of specific instructional strategies as means of achieving educational goals. A later section of this paper will consider means of combining the principles of behavior modifications with those of inductive teaching in a way designed to maximize learning.

B. Language

For the moderately retarded, language plays at least three important roles. First, it is a major vehicle of communication. To fulfill this function, the content (meaning) of utterances is of primary concern. Second, language serves to gain social acceptance. This Function emphasizes the form and manner of delivery of utterances, as well as social roles both as speaker and as listener. While most research has emphasized language only as communication, the social values of this skill have not been ignored (Spradlin and Girardeau, 1963). Third, language is utlimately related to cognitive development (Walden, 1972; Research and Development Center, 1973).
In this role, it serves as a tool for organizing experience and solving problems (Luria, 1963). While many linguists have been concerned with the interrelationship between language and cognition (Piaget, 1963; Vygotsky, 1967; Walden, 1972), few have studied this phenonmenon among the moderately retarded (Luria, 1963; O'Connor and Hermelin, 1963).

Language has often been cited as the major deficit of the moderately retarded (Spradlin, 1963; Blount, 1966; Evans and Apfel, 1968; O'Connor and Hermelin, 1963). Although many authors limit themselves to statements typifying language development of the moderately retarded as "delayed," there have been attempts to define more accurately the nature of language skills exhibited by moderately retarded individuals.

The extensive research on language development has been reviewed in several sources (Dale, 1972; Walden, 1972). This section will deal only with those aspects that appear to be most pertinent to the moderately retarded. Blount (1968) indicates a paucity of American research in this area and a relative wealth of British research. All studies indicate that:

> The more severely retarded are delayed in their language development, but follow the same sequence of development as normals. Contributing to the delay are poor home environments and the depressing effect of institutions (Blount, 1968, p. 23).

A comprehensive early review (Spradlin, 1963) reported that 57 to 82 percent of the moderately retarded evidence noticeable speech defects. Furthermore, it was noted that institutionalization is detrimental to language development; Spradlin (1963) suggests that there may be a common factor that results in both language lag and institutionalization. A series of dyadic studies reveals an interesting social effect of low language skills. Adults evidenced lower type-token ratios and shorter mean response length when talking to a child with low language skills. Thus, the limited language achievement of the child may impoverish his language environment by controlling the level of adult speech he receives.

Sampson (1968) contends that moderately retarded individuals often seem to lack interest in spontaneous speech, that they have a short listening span and use gestures more often than other individuals. These deficits in production are said to be matched by deficits of comprehension.

> This is, however, some evidence to suggest that more intensive, and well directed attention to the language needs of the imbecile from an early age could be helpful. (Sampson, 1968, p. 17)

Beier, Starkweather, and Lambert (1969) compared normal IQ and institutionalized mentally retarded subjects (IQ 23 to 75) on several language measures. They reported that the mentally retarded subjects utter fewer words per minute, use more "positive" words (yes, O.K.), use more self-reference words and show a lower type-token ratio. For both groups, the same 40 words accounted for about half of the spoken vocabulary. The authors conclude that although mentally retarded subjects have adequate memory to learn vocabulary, they show deficits in "conceptualization, organization, language structure, and grammar" (Beier, et al., 1969, p. 933).

Blount (1968) reviewing studies of language in the moderately retarded (through 1967) reports that, in general, the performance of the subjects on verbal tasks exhibited no specific deficits apart from those that could be expected on an MA basis.

Martyn, Sheehan, and Slutz (1969), in a survey of 346 institutionalized mentally retarded subjects (IQ 8 to 77, CA 14 to 73), reported that 20 percent exhibited normal speech, whereas 1/3 had delayed or no speech. One-third of the sample were characterized by articulation problems and an additional 12 subjects had voice problems. A related study (Blanchard, 1964) surveyed the articulation patterns of 350 institutionalized mentally retarded subjects (median CA 12-2, median MA 3-8, median IQ 42) and derived an articulation age for each subject, based on earlier work by Porte (1934) and Templin (1957). Her results indicated that only 10 percent of the sample attained adult speech although about 70 percent reached an articulation age of four years. A later study (Blanchard, 1971) reported the same proportion of subjects attaining adult speech. The differences in the estimates of the above studies are probably due more to population variables (IQ, institution vs. community) than to criterion measure differences. Regardless of exact limits, the results clearly indicate a need for systematic language instruction as an integral component of any program for the moderately retarded.

1. Language and Cognition. A fairly sizable body of research (O'Connor and Hermelin, 1963) has been derived from the theoretical position of Luria (1963). Luria (1963) denotes three developmental stages: 1) practical examination of objects; 2) visual examination plus speech (verbal mediation), and 3) internal speech (mental acts). He claims that the mentally retarded are characterized by: 1) underdevelopment of abstraction and generalization, 2) underutilization of speech as a guide to discrimination; 3) impedence of classifactory skills; and 4) inertness or sluggish lability. These deficits are evidenced in three major performance lacks: 1) inability to use knowledge obtained in spoken form, 2) inability to assimilate speech instructions in a generalized form, and 3) inability to use speech as a means of independent thinking. "The speech processes of the (mentally retarded) change very easily into inert stereotypes and this is the real reason why they cannot play their necessary role in the regulation of action." (Luria, 1963, p. 166)

The programmatic research of O'Connor and Hermelin (1963) is quite extensive; only some of their most useful findings will be discussed in this paper. The interested reader is referred to their monograph for a more complete discussion.

Their subjects were institutionalized moderately retarded individuals and the results offer a number of insights into both deficits and potentials of these subjects. Thus, although the moderately retarded "are rarely able to verbalize strategies and principles of solution in problem solving tasks... semantic generalization does occur......Learning sets can be established," (O'Connor and Hermelin, 1963, p. 55).

A basic cognitive function, concept use and categorization, is heavily dependent on language and also corresponds to the first steps in problem solving, comparable to labeling and detailing in inductive learning (Goldstein, 1969). A finding of major importance establishes the ability of moderately retarded subjects to build up a learning set in a discrimination test and to transfer this learning to related tasks.

> This experiment seems to indicate that (moderately retarded) children are able to use simple concepts as principles of solution, yet their ability to clarify and take note of essential similarities is relatively devised from their ability to formulate such principles verbally, (O'Connor and Hermelin, 1963, p. 61).

A similar statement has been made by Dr. A. B. D. Clarke, interviewed in the film "Path to Fulfillment." He states that experiences in vocational training programs have indicated that if moderately retarded subjects are given rich and varied experiences in motor tasks, they are able to generalize and transfer these skills to new, dissimilar tasks. If motor transfer can be so readily facilitated, it may be possible to improve corresponding verbal skills.

Luria (1961) has claimed that the moderately retarded typically should have difficulty translating motor and verbal behaviors. However, O'Connor and Hermelin (1963) report that with systematic training, this is indeed possible. In fact:

> 1. Severely subnormal children can use concepts as principles of classification, though they may be unable to verbalize such concepts.
> 2. Absence of verbalization leaves a learned perceptual motor response unstable and easily reversible. Reinforcing verbalization leads to a stable and persistent "set," which is difficult to reverse.
> 3. Naming can be transferred from a picture to the written word designating it. Symbols can be taught to evoke the same verbal response as the things they symbolize.
> 4. Discrimination between the learned written word and other similar ones can be taught. A "discrimination set" is transferred to other instances (O'Connor and Hermelin, 1963, p. 70).

It is necessary to insure that the meaning of stimuli is not changed as one shifts from modality to modality. The addition of verbal coding seems to support more effective motor behavior and "allows greater modality of response pattern," (O'Connor and Hermelin, 1963, p. 78).

While their overall findings are consistent with the work of Luria, as with that of House and Zeaman, O'Connor and Hermelin stress:

> ...deficits in acquisition and coding which we consider more important and marked than those in retention and transfer. The deficiency in coding consists of an inability to associate words and signs or words and precepts.
>
> Acquisition seems to be impaired at least partly because of an inability to focus attention on the relevant stimulus features..... We want to stress the lack of expectancies and sets appropriate to the task. In other words, the moderately retarded cannot begin to learn until he has found out what precisely it is that he should learn. This latter process may take a long time. The singling out of relevant features of a stimulus display is helped by naming, labeling, and the use of verbal coding. We have shown that such verbal coding does not frequently occur spontaneously with the moderately retarded.

> Even if they do know the relevant words they tend not to use them as mental tools. We have also shown that this deficit may at least be partly overcome by making coding an intrinsic part of the task.
>
> The diminished responsiveness as well as the lack of perception of signal quality in percepts would indicate the need for presentation of education aids and displays which are quantitatively distinct from those used for normals. Presentation of material at the relatively high intensity level, stressing of relevant aspects of stimuli and sufficient frequency of presentation are all necessary for the severely subnormal child if he is to begin to learn. The moderately retarded should also be taught to verbalize while carrying out motor tasks. (O'Connor and Hermelin, 1963, pp. 107-109)

From the above, it becomes evident that language can serve as a base for improving functioning in both cognitive and motor development. Language aids in organizing and systematizing the environment, serves to make memory more efficient and can direct motor skills. In order to acquire these skills, the moderately retarded must first learn the words and rules for ordering words that comprise language. Language can thus be viewed as a contributor to cognitive development. However, this should not cause us to lose sight of the primary role of language: a means of interpersonal communication. The remaining sections of this chapter will consider some techniques that can be used in teaching language to moderately retarded individuals.

2. Language Assessment. The most frequently used language measures in work with the moderately retarded appear to be the ITPA, PPVT, Mecham Verbal Development Scale, and the Parsons Language Sample (Blount, 1968; Evans and Apfel, 1968; Spradlin, 1963; Gunzberg, 1968). Yoder and Miller (1972, p. 101) provide a list of additional tests for assessing the structure of language, whereas Fokes (1971) has produced a composite scale that incorporates items selected from many earlier scales as well as from language development studies. This scale covers five areas - general characteristics, sound making phonology, intonation, meaning, and grammar - at each of 12 age levels from birth to seven years.

Mittler and Wheldall (1971) have developed a multiple-choice pictorial test of receptive language in which comprehension of 15 sentence types is measured. At the time of publication, the authors were collecting normative data. Although the text is of limited scope, the format and procedure are worth noting.

Bartel, Bryen, and Keehn (1973) report on the use of the Carrow Experimental Text of Linguistic Comprehension with moderately retarded children. The test consists of 114 items; the authors report the MA level at which 60 percent of the subjects comprehend each item. This, like the above, is a multiple-choice pictorial test, although the Carrow offers only three choices. The items "measure a range of lexical, morphological and syntactical performance," (Bartel, et al., 1973, p. 376). Although the authors offer some interesting data on language development, their precise value is uncertain because there is no mention of the number of subjects or whether they were institutionalized or community residents.

Hedrick and Prather (1972) report a model for assessing language development (Table 1) and a test based on this model. The instrument designed for use from birth to five years, has been piloted on 82 subjects of normal IQ, aged three months to four years. The items are undergoing revision and further normative work is planned. The SILD (Sequential Inventory of Language Development) includes 148 receptive and 162 expressive items; it does not tap sentences or other complex utterances.

TABLE 1

Model for Assessing Language Development*

I. Receptive Language
    A. Awareness
    B. Discrimination
    C. Understanding
        1. Speech and gestures
        2. Speech and situational cues
        3. Speech alone

II. Expressive Language
    A. Expressive behaviors
        1. Imitating
        2. Initiating
        3. Responsive
    B. Expressive Measurements
        1. Verbal output
        2. Articulation

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*Hedrick and Prather (1972)

Careful review of these instruments indicates that no one test has been developed that satisfactorily measures all aspects of language behavior or all developmental levels of almost any aspect. Since language is comprised of a number of skills, which develop at varying rates, a truly complete language test might not even be possible.

Rosenberg (1970), as part of a discussion of general problems of language development in retarded children, suggests the following "minimal requirements for a language assessment device":

1. It must be based upon an adequate characterization of the structure of language.
2. It must reflect our knowledge of normal language development.
3. It must be able to differentiate between underlying linguistic competence and observable linguistic performance.
4. Scoring will have to reflect dialect idiosyncracies.
5. Items should be grouped for scoring according to whether they reflect primarily maturational development...or learning...
6. The items should reflect the full range of linguistic competence...," (Rosenberg, 1970, pp. 209-210).

Although these criteria reflect a transformational biological orientation, there is much that would be generally acceptable and useful programatically. Based on such criteria, it becomes possible to select a battery of tests to be used for specified purposes and at various developmental levels, that would appropriately accompany an instructional program. At no time would the goal of testing be the attainment of a complete evaluation of a child's linguistic skill. Instead, periodic testing would evaluate specific skills in limited areas. The model (Table I) developed by Hedrick and Prather (1972) could serve as a good initial guide for assessment of early language development. Later, vocabulary could be evaluated with the PPVT or an original inventory, and syntactic development could be assessed by a combination of techniques suggested by Dever (1973); Bartel, et al., (1973) and Mittler and Wheldall (1971). An expanded version of an assessment outline, shown in Table 2, draws upon these techniques as well as ideas suggested by Piaget (1963), Vygotsky (1967), and Goda (1960, 1969).

3. Language Programs. Although some authors have attempted to devise unitary approaches across the entire range of language development, there seems to be greater strength in an approach that varies the instructional methodology with various levels of linguistic skills. This section will use the overall pattern of language acquisition as a framework for selecting various language instruction techniques. Language development will be divided into three major stages:

1) instituting language - development of receptive skills, inner language, and initial attempts to make meaningful vocal productions or gestures.
2) learning words - initial acquisition of expressive vocabulary (verbal or gestural).
3) learning syntax - combination of two or more utterances and acquisition of the linguistic rules for making such combinations.

These stages are not discrete; they overlap. That is, the child does not acquire all Stage 1 skills before beginning Stage 2. However, he cannot begin to learn Stage 3 skills before acquiring some Stage 2 skills. Moreover, although a child may acquire many Stage 1 and 2 skills without needing to speak, the skills of Stage 3 require spoken language (some children, e.g., deaf youngsters may substitute a formalized gestural system, thereby acquiring some of these skills). These stages correspond to what Chapman (1972) has referred to as the three major organizational components of any

TABLE 2

Expanded Language Assessment Model[1]

I. Receptive Language

- A. Consider awareness, discrimination, and understanding in each area.
- B. Types of content: speech and gestures; speech and situational cues; speech alone; gestures alone.
- C. Levels of receptive language: noises; single words and word elements; phrases; simple sentences; complex sentences.

II. Expressive Language

- A. Expressive behaviors: imitating; initiating; responding.
- B. Areas of expressive language:
  - 1. Prespeech: isolated sounds and syllable chains without apparent awareness; syllable chains with identifiable vowels and consonants produced without apparent awareness; auditory awareness of self-produced sound; awareness of sounds produced by others with imitation; acquisition of one or more spoken words.
  - 2. Speech:
    - a. Vocabulary: nouns; verbs; descriptors; function words.
    - b. Suntax (grammar): types of utterances (mands, tacts); length and complexity of utterances.
  - 3. Gestures

III. Social Speech

- A. Egocentric: repetition; monologue; collective monologue.
- B. Socialized speech: adapted information; criticism; commands; questions; answers.
- C. Ratio of A to B.

IV. Language and Cognition

- A. Inductive thinking: labeling, detailing, inferring, predicting, generalizing.
- B. Categorizing experience.
- C. Directing/controlling behavior.

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[1] Derived from Bartel et al. (1973), Dever (1973), Goda (1960, 1969), Hedrick and Prather (1972), Mittler and Wheldall (1971), Rosenberg (1970), Piaget (1963) and Vygotsky (1967)

language: phonology (sound), semantics (word meaning), and syntax (word order).

Much of the initial work on language development with the moderately retarded focused on traditional forms of speech therapy (Spradlin, 1963). Raymore and McLean (1972) reported that 79 percent of institutionalized subjects have articulation problems; traditional therapy has been ineffective. They report a program based on behavior modification principles that can be organized by a speech therapist and carried out by paraprofessionals. Blount (1968) reports on some attempts to improve language through rather general procedures; these generally have met with minimal success. Thus, the Peabody Language Development Kits (Blount, 1968) have proven of limited value because of their lack of sequence and systematic attention to specific language skills. Despite this, they are valued by many teachers for general language stimulation and vocabulary development. Rosenberg (1970) offers a particularly incisive review of the weaknesses of these kits.

Two studies are worthy of note for demonstrations of the effects of specific aspects of language enrichment. Hammond (1968) analyzed the effects of foster grandparents on the language of institutionalized moderately retarded subjects. In an ex post facto design, he compared taped speech samples and PPVT scores of subjects who had foster grandparents with those of subjects who had not. He found a significant positive effect on PPVT scores and extent of verbalization. The effect was more marked on those in the upper half of his IQ range and more marked in boys than in girls.

Bennett (1969) attempted to facilitate language development indirectly, that is, through reinforcement of ward attendant behavior. Following a TV training session for attendants, a language development technician assigned to each unit would support attendant behaviors enhancing language. After three months, residents on four wards showed a significant gain on the Parsons Language Sample and the Mecham Verbal Development Scale. The implications of these studies for staffing in programs for the moderately retarded will be considered in a later section. At this time, it is worth noting that global programs may increase language output, but are less likely to pinpoint growth in specific skills.

The advent of experimental behavior analysis (a refinement of operant conditioning and behavior modification) has opened new vistas on the development of language instruction programs. As early as 1963, Spradlin reviewed a number of studies demonstrating that operant techniques can facilitate language acquisition. Throughout the 1960s, these were attempts to systematize the applications of Skinnerian principles to the development of language programming (Evans and Apfel, 1968; Sloane and MacAulay, 1968). The establishment of the Behavior Data Bank at Kansas State College offers a valuable resource.

Now in the early 1970s, the best emergent strategies are behavioral in nature, systematic and cognizant of language topographies (MacLean, 1972). The goals of such programs must be both functionally desirable and reasonably attainable:

> The key to intervention programming in language is to select stimulus events which carry the sensory information needed to evoke the particular responses desired from the particular client being trained.
> A program must be designed to allow the client to discover the laws which relate these desired responses to each other and to the environment, (MacLean, 1971, p. 7).

A. Instituting Language. The initial stage of language acquisition begins with the development of receptive language - the awareness and comprehension of other people's utterances. Five levels of prespeech language have been identified.

1. isolated sound and syllabic chain utterances without operant auditory awareness,
2. syllabic chain utterances made up of vowels and consonants without apparent auditory awareness,
3. auditory awareness of self-produced sounds with frequent repetition of favored sounds,
4. auditory awareness of sounds of others with imitation of these sounds,
5. acquisition of one or more meaningful words (Goda, 1969).

Accompanying this are parallel developments in receptive language. Goda and Rigrodsky (1962) denote the following stages in listening skills: noisemakers, single words and elements, phrases, simple sentences, and complicated sentences.

Risley, Hart, and Dale (1972) describe a paradigm of operant language development which is heavily dependent upon imitation. Research reviewed by them has indicated that imitation, as a general class of behaviors, can be increased through the use of operant techniques. Imitation may be taught by combining shaping or chaining with physical manipulations of the subject (Turnure and Rynders, 1973).

Imitation is suggested as the first step in teaching language to nonspeakers. Food reinforcers, following mild food deprivation, has been effective in early instructional stages. After the child has begun imitating sounds, utterances can be elaborated by shaping and/or chaining. Language may have been nonreferential up until this point; the next step involves labeling, using prompting as an aid. Following this, phrases are introduced (Risley, et al., 1972).

The remainder of language instruction should take place in natural settings where the children have something stimulating they will want to talk about. The use of natural reinforcers within activity situations aids in the desired language elaboration. Specific techniques are referred to in an extensive bibliography (Risley, et al., 1972).

Buddenhagen (1971) presents four highly detailed case studies as examples of a program for instituting language in mute children. His work is based on behavior modification techniques described by Risley (1966) and Sapon (1964). Sapon's strategy emphasizes positive reinforcement, instruction within a meaningful language environment, and phonetic analysis. The program developed by Buddenhagen (1971) teaches one phoneme at a time in each position (initial, medial, final). This became necessary as he found that learning one phoneme in one position did not necessarily generalize to enable the child to produce the same phoneme in other positions. His study details the procedures and problems encountered in teaching specific phonemes.

Subject attention and cue distinctiveness are key variables in instituting language; imitation becomes a major tool. Visual cues (exaggerated mouth movements) are used as supportive aids in teaching sounds, plus the acoustic and kinesthetic feedback provided by practice.

> The child cannot see most of the relevant features of the modeled stimulus, nor can his attempted imitations be modified by verbal directions from the modeler (p. 136). Features of the Educator's models which were not visible to the subject were typically very difficult to establish (Buddenhagen, 1971, pp. 138-139).

The procedures initially used reinforcement techniques to establish generalized imitation. A combination of social and material reinforcement was found to be best for the maintenance of a maximum rate of learning; there was no use of time out and/or punishment.

Chalfant, Kirk, and Jensen (1968) prepared the foundation for a receptive language program, which was refined and implemented by Tawney and Hipsher (1972). This program capitalizes on the child's ability to imitate and gesture, and pairs it with a highly structured teaching methodology in a precision teaching paradigm. The program is primarily concerned with teaching nouns and verbs (Tawney and Hipsher, 1970).

Kent (1972) begins his program at the preverbal level. Initial concern is with attending, motor imitation, vocal imitation, and structured group play. Later, instruction focuses on a linguistic receptive repertoire and a prelinguistic (gestural) repertoire.

The programs reviewed in this section make the fewest possible assumptions about entry skills. They all expect at least the physical ability to produce sounds and some degree of intactness of hearing and vision. The next section considers programs that assume some competence in receptive and expressive skills.

B. Learning Words. Many programs have attempted to increase vocabulary development by various general enrichment procedures (Walden, 1972). However, more systematic, focused approaches have generally proven more effective. Guess (1969) trained psychiatric aides as language developmentalists and provided a set of 200 lesson plans in four areas: vocabulary building, activity, conversation, and sound discrimination. Institutionalized moderately retarded subjects were divided into four groups: language instruction only, special education only, language and special education, and no program. After 9 and 18 months, subjects who had received language instruction made significant gains in Stanford-Binet and ITPA raw scores. Guess (1969) attributes the success to three factors: the use of paraprofessionals, a token reinforcement system, and the provision of intensive language instruction.

Marshall and Hegrenes (1972) seem to be responding to Luria's analysis of linguistic skills in delineating four aspects of functional verbal communication, which serve to organize and categorize experiences: space, proprioception, transmission, and identity.

W. Bricker (1972) developed a model for language training in a behavioral framework (see Figure 1):

> Imitation is the most efficient means for establishing a verbal repertoire and reinforcement is necessary for modifying and maintaining it, (W. Bricker, 1972, p. 85).

The model calls for "the inductive construction of words out of speech sounds" (W. Bricker, 1972, p. 85).

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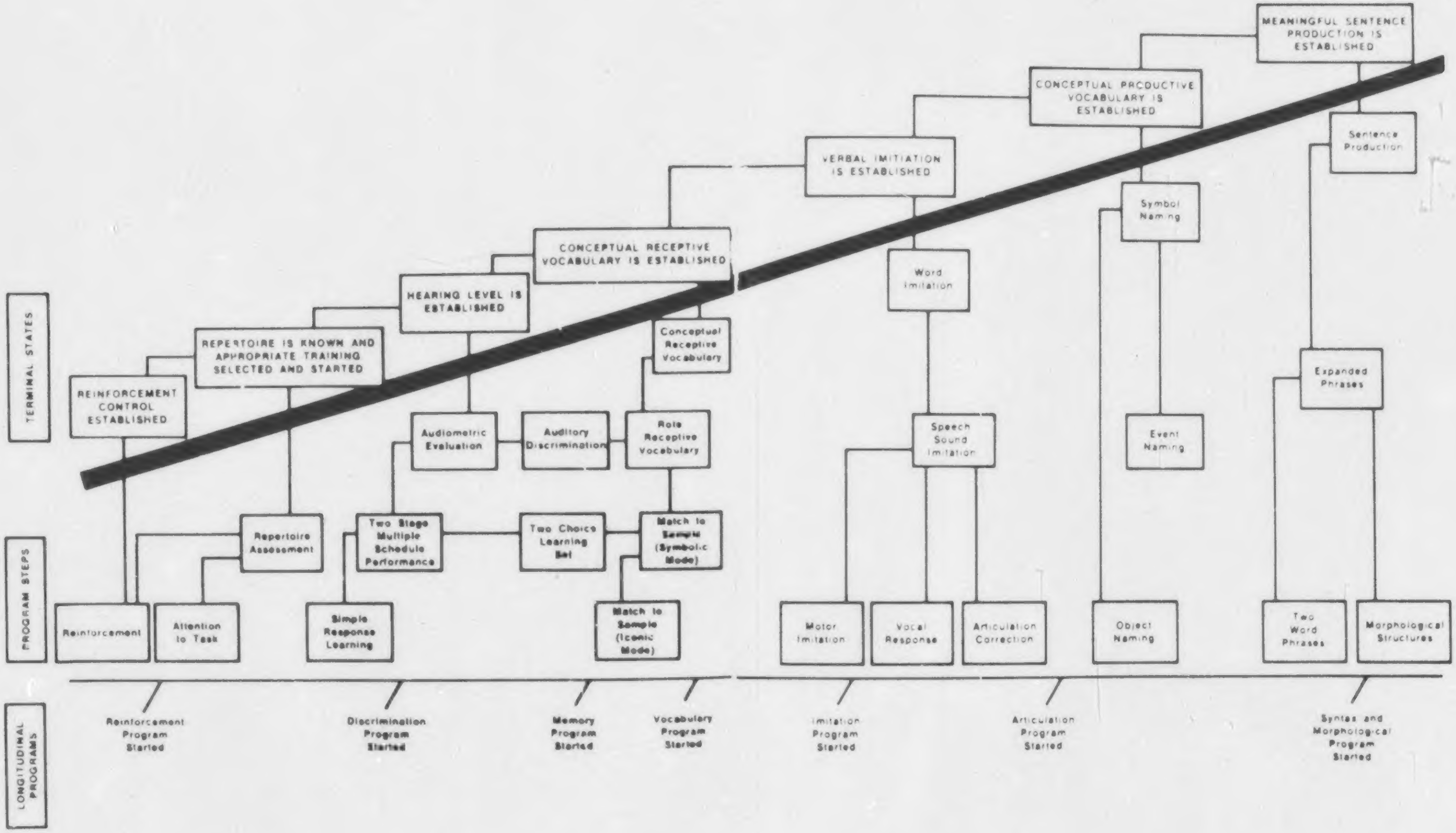
TERMINAL STATES
PROGRAM STEPS
LONGITUDINAL PROGRAMS
REINFORCEMENT CONTROL ESTABLISHED
REPERTOIRE IS KNOWN AND APPROPRIATE TRAINING SELECTED AND STARTED
HEARING LEVEL IS ESTABLISHED
CONCEPTUAL RECEPTIVE VOCABULARY IS ESTABLISHED
VERBAL IMITIATION IS ESTABLISHED
CONCEPTUAL PRODUCTIVE VOCABULARY IS ESTABLISHED
MEANINGFUL SENTENCE PRODUCTION IS ESTABLISHED
Reinforcement
Attention to Task
Repertoire Assessment
Simple Response Learning
Two Stage Multiple Schedule Performance
Audiometric Evaluation
Auditory Discrimination
Two Choice Learning Set
Match to Sample (Iconic Mode)
Match to Sample (Symbolic Mode)
Rote Receptive Vocabulary
Conceptual Receptive Vocabulary
Motor Imitation
Vocal Response
Articulation Correction
Speech Sound Imitation
Word Imitation
Object Naming
Event Naming
Symbol Naming
Two Word Phrases
Morphological Structures
Expanded Phrases
Sentence Production
Reinforcement Program Started
Discrimination Program Started
Memory Program Started
Vocabulary Program Started
Imitation Program Started
Articulation Program Started
Syntax and Morphological Program Started

Lattice of language

D. Bricker (1972) has begun to explore imitative sign teaching (gestural signs learned by imitating E) as a means of facilitating word-object associations. Subject is required to use a specific gesture when he is cued by Educator. Initial cues are actual presentations of the referent; this is later paired with the spoken word. Finally, Educator cues only with a spoken word and subject must respond with the appropriate gesture. Twenty-six institutionalized mentally retarded children (XSQ = 31, XCA = 12) practiced 30 times. In one half hour, subjects acquired from 15 to 27 items, thus revealing marked heterogeneity in both rate and absolute number of acquisitions.

D. Bricker (1972) bases this work on the premise that motor movements are good mediators for learning labels. This is an interesting converse of Luria's use of labels to learn motor movements. Furthermore, it could provide an alternative for children who cannot produce sound. This technique might also prove useful as part of a remedial program for language-impaired youngsters whose psycholinguistic profiles indicate relative strength in visuomotor areas. For example, Belmont (1971) reports that a significant number of Down's Syndrome children exhibit just such a profile.

C. Learning Syntax. Of central concern in the teaching of syntax is the distinction between competence and performance. Competence is inferred by an observer. It refers to a set of principles which a speaker must be able to use (although he may not be able to identify) in order to speak a language. The actual observed behavior is the performance (Chapman, 1972). In teaching, we seek to improve competence, but are able to judge this only by drawing inferences from observed performance.

Various authors have charted the stages from single-word utterances to complex sentences (Dever, 1973; Dale, 1972; Walden, 1972), attaching various labels to each level. Bellugi (1972) claims that the most useful guide is the length of the utterance; she depicts three stages: 1) 1.5 to 2.0 morphemes per utterance (telegraphic speech); 2) 2.0 to 2.5 morphemes per utterance (phrases); and 3) 2.5 to 3.1 morphemes per utterance (simple sentences). Miller and Yoder (1972) are typical of the more usual descriptive approach:

1. single word utterances (function and referent words),
2. word strings,
3. syntactic constructions (two words),
4. three word sentences.

They used this model plus L. Bloom's developmental data to produce a syntax teaching program that incorporates operant conditioning, imitation (Brown and Bellugi's technique), and modeling (Cazden's technique). Another program emphasizing similar features is described by Kluppel (1971).

While using certain similar features, Dever (1973) has developed a program with a unique feature: it incorporates techniques that have been successful in second language teaching. T.A.L.K. (Teaching the American Language to Kids) drawing on applied English linguistics, uses conversation drills (10 minutes daily) as its primary tool.

In these drills, which are basic to an audiolingual approach, the "learner is presented with a stimulus pattern that he is expected to change in some way in making his response" (Dever, 1973, p. 2). For example, the following might occur:

Teacher: Ask me if Johnny can play hopscotch.

Student: Can Johnny play hopscotch?

The response indicates that the child understands the request and can rearrange the words to form a new sentence. The drills specify only the clause and sentence pattern; the teacher selects and adds vocabulary content appropriate to the particular setting.

Dever presents a series of 23 forms to be taught, including most syntactic forms needed for everyday communication. He cautions that the drills are only half of the teaching process; "the teaching of how and where to use these must take place outside of the drill proper" (Dever, 1973, p. 3).

A more highly structured approach is reported by Gray and Ryan (1973). They have developed a series of 41 programmed instruction units for teaching language (Gray and Ryan, 1972). The programs stress syntactic forms, although one of them does concern articulation (see Table 3). Although the programs themselves are available only to those who have completed a special course of training, the monograph rather fully describes principles for developing similar programs.

Finally, a series of studies conducted at Indiana University may contribute information on teaching some specific components of any language program for the moderately retarded. Semmel and Greenough (1968) studied the effects of sentence complexity on comprehension and imitation. Their results suggest that moderately retarded subjects experience difficulty with passive and, particularly, negative transformations. These subjects may not consider the effects of negation or may not attend to the relevant cues (negative markers). In both this and a later study (Greenough, 1969),

Table 3

Language Curriculum*

A Core

1. Identification of nouns
2. Naming nouns
3. In/on
4. Is
5. Is verbing
6. Is interrogative
7. What is
8. He/she/it
9. I am
10. Singular noun present tense
11. Plural noun present tense
12. Cumulative plural/singular present tense
13. The

B Secondary

14. Plural nouns are
15. Are interrogative
16. What are
17. You/they/we
18. Cumulative pronouns
19. Cumulative is/are/am
20. Cumulative is/are/am interrogative
21. Cumulative what is/are/am
22. Cumulative noun/pronoun/verb/verbing
23. Singular and plural past tense (t and d)

C Optional

24. Was/were
24. Was/were interrogative
26. What was/were
27. Does/do
28. Did
29. Do/does/did interrogative
30. What is/are doing
31. What do/does/did
32. Negatives not
33. Conjunction and
34. Infinitive to
35. Future tense to
36. Future tense will
37. Perfect tense has/have
38. Adjectives
39. Possessives
40. This/that/a
41. Articulation

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*Gray and Ryan, 1973, p. 27.

subjects more accurately imitated kernel sentences than transformed sentences.

The emphasis of syntax teaching programs is more often placed on social exchange of information than was placed on programs in the two areas previously reviewed. Syntax teaching seems to be facilitated by more complex teacher-pupil interaction, accompanied by specification of goals and systematic reinforcement.

4. Summary

It now seems clear that there are numerous well established principles to help in the development of the language component of a curriculum for the moderately retarded. Although there has been an attempt to indicate these principles throughout the preceding discussion, this section will attempt a final synthesis.

The potential contribution of language to cognitive development must be exploited at every opportunity. Learning to label parts of the environment is the first step towards problem solving. Practice in categorizing aids in detailing. The facilitation of motor skills via verbal mediators could also prove valuable in later life.

However, the overriding goal in teaching language is the facilitation of social behavior by enhanced communication. This requires that children be provided with many situations in which they may apply appropriate language skills. Children must be encouraged to talk to one another as well as to adults. The teacher needs to be sensitive to every possible language occasion and, if necessary, children for appropriate practice.

A variety of approaches to language instruction will be needed so that teaching method is matched to content at each step. Thus, there must be a fine-grained analysis of the sequential development of all kinds of linguistic skills accompanied by a specification of procedures to be used. At the earliest language levels, the instructional program will be more highly structured than later. Instructional techniques will draw heavily upon an operant paradigm, although inductive teaching will play a role that will increase as instruction approaches higher levels of language skill.

At the earliest level (instituting language), modeling and immediate imitation will be the major technique. Chaining and successive approximations aid in the establishment of a vocal repertoire. Systematic gestures may be introduced to support the development of receptive language.

As the child begins to build his expressive vocabulary, modeling takes on a different connotation. At this level, as well as in syntactic development, it is valuable to systematically expose the child to a rich linguistic environment in settings that encourage conversation. At this point, imitation is not required every time the teacher provides a model. Indeed, we begin to focus on peer models and reinforce desired behaviors as they occur naturally.

While much of syntax is learned simply through exposure to a planned series of events (accompanied by appropriate reinforcers), it may be necessary to teach some forms through specific drills. When this is done, the drills must be accompanied by social situations in which children may naturally use the forms on which they have drilled. An inductive approach will be emphasized in the learning of more complex utterances and in refining language skills.

Evaluation of student progress is likely to be based on a series of selected tests, each of which has been designed to assess a particular skill area within a specified developmental level. Assessment should be designed as an integral part of the instructional program rather than as something external to it.

C. Social Behavior. There are more assumptions and stereotypes than facts in most of the early research on the social behavior of the moderately retarded. The efficacy studies (Kirk, 1963; Guskin and Spicker, 1968) are rife with instruments that assume a spectrum of social limitations. Saenger's (1957) pioneer study collated interviews and anecdotal data on 520 adults who were former students in New York City classes for "trainable" children. A more recent follow-up study (Standfield, 1973), although still within this descriptive context, presents more substantive data on post-school behaviors. As the research of the 1960s and the early 1970s is reviewed, this descriptive approach continues. However, there is a small but growing body of research that considers means of modifying specific social behaviors.

Eagle (1967) synthesized data gathered on 12,471 subjects of 36 follow-up studies completed between 1941 and 1965. The subjects, in all cases, were institutionalized retardates (most within the moderately retarded range) who had been returned to the community. Failure of placements, judged differently by each study, showed a 39.6 percent rate overall, although for the 1960-1965 period, the rate was 52 percent. The causes of failures fell into the following categories:

A. Antisocial actions (sex and legal problems)
B. Undesirable personal conduct
C. Personality problems
D. Unsatisfactory work
E. Health problems
F. Escape or voluntary return to institution
G. Adverse environmental factors
H. Transfer to other facilities

Furthermore, there appeared to be a relationship between the type of community placement and the reasons for failure. That is, for those who had been placed with their own families, two thirds of the failures were owing to what was described as antisocial actions (A), whereas adverse environmental factors (G) and health problems (E) accounted for an additional 25 percent. Adverse environmental effects (G) accounted for one third of the failures of placements to "other family" care, whereas in vocational placements the leading reasons given for failure were antisocial actions (A), personality problems (C), and unsatisfactory work (D).

Stayton et al. (1968) observed 40 institutionalized retardates ($\overline{X}_{IQ} = 38$, $\overline{X}_{CA} = 8.5$) daily for a twenty-day period. Behaviors were categorized in terms of physical or verbal affection and physical or verbal aggression. Within each category, each behavior recorded was rated on intensity. The three scores obtained (total behavior, affection, and aggression) were correlated with IQ, MA, and length of time at home (prior to institutionalization). The results indicated that there was more affectionate than aggressive behavior on these ratings.

> Total social interaction, affection, and aggression were all significantly correlated with length of time at home. However, when partial correlations were done, holding constant...MA, CA, and IQ, it was found that only aggression was signficantly correlated with time at home. (Stayton et al., 1966, p. 866)

Kapfstein (1971) developed a rating scale based on social learning theory in an attempt to study the occurrence of natural social reinforcers in peer interactions of moderately retarded children. Two classes were observed daily for 15 weeks during a free-play period. The focus was on peer interactions. He attempted to determine whether peer reactions immediately following a child's behavior functioned as positive and/or negative reinforcers. Kapfstein hypothesized that if the behavior of the trainable mentally retarded is followed by a positive peer reaction, he will tend to repeat it. If followed by a negative reaction, the trainable mentally retarded will change his behavior. This hypothesis was not supported in cases of aggressive behaviors but was confirmed for social talk and nonaggressive interactions. The study reported, though, that reinforcer effects are not readily identified through observations of immediate consequences of social activity. However, the rating scale used in this study would be helpful in future applications.

Abelson and Johnson (1969) compared two groups of moderately retarded ($\bar{X}_{IQ} = 31.7$) subjects who exhibited problem behaviors (aggressive and heterosexual). They reported a number of behaviors typical of each group; positive behaviors (indicating potential success in community placement) were attributed more often to those in the heterosexual problem group.

Language is a major component of socialization in our society. Blount (1969) is among those who have suggested that there is a strong relationship between language skills and social acceptance of the retardate. A comprehensive early review (Spradlin, 1963) reported that 57 to 82 percent of the moderately retarded evidenced noticeable speech defects.

Furthermore, it was noted that institutionalization is detrimental to language development; Spradlin (1963) suggests that there may be a common factor that results in both language lag and institutionalization.

A series of dyadic studies reveals an interesting social effect of low language skills. Adults evidenced lower type-token ratios and shorter mean response length when talking to a child with low language skills. Thus, the limited language achievement of the child may impoverish his language environment by controlling the level of adult speech he receives.

King (1971) examined the relationships between MA, level of language functioning, and social acceptability in the moderately retarded. Measures of intelligence (the Leiter), speech and language measures, and ratings of functional level and social acceptability were obtained on 80 institutionalized and noninstitutionalized trainable retardates. Institutionalization did not significantly affect language ability; however, the day school subjects were found to be functioning better. The relationship between MA and speech and language performance was stronger than the relationship between CA and Leiter test performance, as expected. Language ability was found to be significantly related to both social acceptability and judged functioning level.

Spradlin, Girardeau, and Corte (1967, 1969) report a series of studies of social communication among dyads of institutionalized moderately retarded youngsters. Although some form of communication was inferred from the delivery or withholding of reinforcers, there was no reported overt gesturing or speech. The structure of the experimental setting and task did nothing to encourage such behavior. Although the authors discuss physical arrangements that may stimulate speech, they never consider the single expedient of telling subjects that they may talk during the task. Weiss and Weinstein (1968), using a structured interior technique, analyzed the interpersonal tactics of institutionalized and non-institutionalized retardates. The responses indicated a very meagre response strategy repertoire.

Rolland (1970) developed an observational scheme based on Berne's concept of Transactional Analysis. This was used to study mutual reinforcement of social behavior. A pilot study indicated that the TA procedure yields reliable data with moderately retarded subjects. Furthermore, at least in this instance, it could be shown that subjects established and used social contingencies with each other.

Another attempt to evaluate interpersonal behavior is exemplified by the Children's Minimal Social Behavior Scale (Finch and Ginn, 1973). This rating scale:

> can be expected to serve as a highly useful instrument in planning social groups for retarded adults since it gives a quick and accurate estimate of social interaction skills (Finch and Ginn, 1973, p. 468).

Although defects in social behavior are recognized as the hallmark of mental retardation, there have been scarcely any systematic studies in this area. Behaviorally oriented research has generated a few experiments (Altman, 1971; Anderson and Rosenthal, 1968; Baldwin, 1967; Gayton and Bassett, 1972; Vanevery, 1970), often involving considerations of social reinforcement effects. More general considerations of social behaviors and social interactions are often limited to platitudes in various curriculum guides. A notable exception is the work of Barbara Edmonson (1967) on teaching social signal decoding. Although this experimental 8-week teaching unit was designed for EMRs, it has many features that can be used with the moderately retarded.

The earliest attempt to measure adaptive behavior has been traced (Leland, et al., 1967) to Voisin (1843) who seems to have developed a sort of rating scale. The earliest measure of adaptive behavior to take root in this country was the Vineland Social Maturity Scale, developed in 1936 by E. A. Doll. As late as 1961 it was still considered the best single measure of adaptive behavior. In 1959, the American Association on Mental Deficiency (AAMD) introduced the concept of adaptive behavior as a diagnostic criterion of mental retardation and by 1961 the concept was made part of the definition of mental retardation.

> Mental retardation refers to sub-average general intellectual functioning which originates during the developmental period and is associated with impairment in adaptive behavior (Heber, 1961, p. 3).

Adaptive behavior is defined as:

> The effectiveness with which an individual copes with the natural and social demands of his environment.

It has two major facets:

> 1) the degree to which the individual is able to function and maintain himself independently, and
> 2) the degree to which he meets satisfactorily the culturally imposed demands of personal and social responsibility, (Heber, 1961, p. 61).

Subsequently, the AAMD set out to develop a precise understanding of the concept of adaptive behavior as it related to mental retardation and to develop a useful technique for its measurement form infancy to adulthood. The years since 1961 have seen a proliferation of adaptive behavior measures reported in the literature.

The change in the AAMD definition of mental retardation to include adaptive behavior has generated fierce debate and discussion. some would discard it immediately given half a chance (Clausen, 1972a, 1972b; Nagler, 1972), while others recognize its shortcomings but, nevertheless, support its inclusion (Leland, 1972; Wilson, 1972; MacMillan, 1972; Balthazar and English, 1969). Basically, the argument against its inclusion in the mental retardation definition posits that the concept of adaptive behavior is not well defined and not well measured. It argues that inclusion only results in confusion, rather than adding clarity about the condition known as mental retardation. Those who favor its inclusion point out that, after all, mental retardation is a condition reflecting social incompetence and should, therefore, be measured not only by IQ tests, but by social competency measures as well. They argue that adaptive behavior is an educationally relevant concept that ought not be discarded merely because adequate measures have not yet been devised. The issue becomes even more confused when adaptive behavior is accepted for purposes of definition but rejected for purposes of diagnosis (Halpern, 1968).

It should already be clear that this project takes the position that an impairment in adaptive behavior is, for the purposes of curriculum development, the most important aspect of any definition of mental retardation. However, the utility of this concept for program planning is limited by the difficulties that have attended its precise definition and measurement.

Following the publication of the AAMD definition (Heber, 1959), a number of instruments seeking to measure this dimension were developed. Leland et al. (1967) present a review of 12 such measures within the framework of the behavior domains recognized by each. This is summarized in Table 4. A quick glance at the table indicates that 4 measures stand out as recognizing the greatest number of domains. In their orders of inclusiveness they are: 1) Adaptive Behavior Checklist (AAMD), 2) Vineland Social Maturity Scale (Doll), 3) Social Competence Inventory for Adults (Banham), and 4) Progress Assessment Chart - Form II (Gunzburg). Interestingly enough, these 4 measures emphasize the individual's social competence as opposed to an emphasis on personal and social adjustment or maladaptive behavior.

Many other measures of adaptive behavior have been developed with varying degrees of standardization. On the whole, the literature shows a preponderance of studies involved in factors analyzing these adaptive behavior measures. The measures currently undergoing the most thorough analysis appear to be the AAMD Adaptive Behavior Checklist (Nihira, Foster, and Spencer, 1968; Nihira, 1969a, 1969b, 1970; Foster and Nihira, 1969); the Balthazar Scales of Adaptive Behavior, also known as the Central Wisconsin Colony Scales (Balthazar and English, 1969a, 1969b); the Fairview Problem Behavior Record also known as the Fairview Self-Help Scale (Ross, 1970, 1971). Other less popular measures include the Vocational Adjustment Rating Scale (Daniels, 1972), the Selingsgrove State School and Hospital Resident Rating Scale (Lyle and Thomas, 1971), and the Miami Sunland Training Center Version of the Adaptive Behavior Checklist (Allen, Cortazzo, and Adamo, 1970).

The change in the AAMD definition of mental retardation to include adaptive behavior has generated fierce debate and discussion. some would discard it immediately given half a chance (Clausen, 1972a, 1972b; Nagler, 1972), while others recognize its shortcomings but, nevertheless, support its inclusion (Leland, 1972; Wilson, 1972; MacMillan, 1972; Balthazar and English, 1969). Basically, the argument against its inclusion in the mental retardation definition posits that the concept of adaptive behavior is not well defined and not well measured. It argues that inclusion only results in confusion, rather than adding clarity about the condition known as mental retardation. Those who favor its inclusion point out that, after all, mental retardation is a condition reflecting social incompetence and should, therefore, be measured not only by IQ tests, but by social competency measures as well. They argue that adaptive behavior is an educationally relevant concept that ought not be discarded merely because adequate measures have not yet been devised. The issue becomes even more confused when adaptive behavior is accepted for purposes of definition but rejected for purposes of diagnosis (Halpern, 1968).

It should already be clear that this project takes the position that an impairment in adaptive behavior is, for the purposes of curriculum development, the most important aspect of any definition of mental retardation. However, the utility of this concept for program planning is limited by the difficulties that have attended its precise definition and measurement.

Following the publication of the AAMD definition (Heber, 1959), a number of instruments seeking to measure this dimension were developed. Leland et al. (1967) present a review of 12 such measures within the framework of the behavior domains recognized by each. This is summarized in Table 4. A quick glance at the table indicates that 4 measures stand out as recognizing the greatest number of domains. In their orders of inclusiveness they are: 1) Adaptive Behavior Checklist (AAMD), 2) Vineland Social Maturity Scale (Doll), 3) Social Competence Inventory for Adults (Banham), and 4) Progress Assessment Chart - Form II (Gunzburg). Interestingly enough, these 4 measures emphasize the individual's social competence as opposed to an emphasis on personal and social adjustment or maladaptive behavior.

Many other measures of adaptive behavior have been developed with varying degrees of standardization. On the whole, the literature shows a preponderance of studies involved in factors analyzing these adaptive behavior measures. The measures currently undergoing the most thorough analysis appear to be the AAMD Adaptive Behavior Checklist (Nihira, Foster, and Spencer, 1968; Nihira, 1969a, 1969b, 1970; Foster and Nihira, 1969); the Balthazar Scales of Adaptive Behavior, also known as the Central Wisconsin Colony Scales (Balthazar and English, 1969a, 1969b); the Fairview Problem Behavior Record also known as the Fairview Self-Help Scale (Ross, 1970, 1971). Other less popular measures include the Vocational Adjustment Rating Scale (Daniels, 1972), the Selingsgrove State School and Hospital Resident Rating Scale (Lyle and Thomas, 1971), and the Miami Sunland Training Center Version of the Adaptive Behavior Checklist (Allen, Cortazzo, and Adamo, 1970).

TABLE 4

Areas of Rating Scales[a]

	Behavior Domain											
Scales	Self-help	Communication	Social	Locomotion	Self-Direction	Occupation	Neuromotor	Pers. Resp.	Social Resp.	Emot. Adj.	Health	Economic Activity
PAC-II [1]	X	X	X	X	X	X	X					X
Vineland[2]	X	X	X	X	X	X	X	X	X			X
SCS [3]	X	X	X		X	X						
BAS [4]		X	X							X		
CBRI [5]	X	X	X		X		X			X		
ILRP [6]	X	X	X	X	X	X						X
Gardner[8]	X		X		X	X		X		X		
CBRS [9]			X							X	X	
HSS [10]	X	X	X		X	X						X
Perf.Rec. [11]			X		X			X	X	X		
ABC [12]	X	X	X	X	X	X	X	X	X	X		X
SCIA [7]	X	X	X	X		X		X	X	X		X

1. Gunzburg, 1965
2. Doll, 1964
3. Cain et al., 1963
4. Ellsworth, 1962
5. Burdock and Hardesty, 1963
6. Katz, 1963
7. Banham, 1960
8. Wilcox, 1942
9. Cassel, 1962
10. McReynolds, et al., 1953
11. Flanagan, 1956
12. Nihira and Foster, 1966a

a. Taken from Leland, et al., 1967, pp. 374-7

Finally, some educators are developing rating scales by modifying the AAMD Adaptive Behavior Scales to facilitate scoring, administration, and clarity (Bhattacharya, 1973) or to enhance its utility with profoundly retarded populations (Congdon, 1973).

The measures differ primarily in scope rather than in the kinds of behavioral areas assessed. Standardization, with resultant differences in validity and reliability, vary widely. The extant measures have been criticized as not sufficiently objective, not sufficiently comprehensive, and not sufficiently clear and free from ambiguities (Leland et al., 1967 Gardner and Giampo, 1971; Bhattacharya, 1973). While the AAMD scales are seen as the best available (Gardner and Giampa, 1971), Bhattacharya (1973) questions the relevance of the behavioral dimensions tapped by these scales.

Leland (1972), one of the authors of the scale, points out that the Adaptive Behavior Scales were not meant to be considered "definitive." They were essentially prototype scales designed to measure adaptive behavior among institutionalized populations and to aid in furthering research with the retarded within the community as a whole. The ultimate aim was to create a scale that could generate proper treatment intervention.

Several authors have realized the value of the latter aim and have studied the effects of various training programs on improving adaptive behavior. Vogel, Kun, and Meshorer (1968), for example, found that behaviors that can be taught and learned (such as personal skills) show correlation with MA, whereas affective, temperamental, and social behaviors are more difficult to teach and learn and do not show correlation with MA. They predict that since job success depends on both personal skills and affective-social behaviors, MA will not correlate highly with job success.

Edar et al. (1969) found that improvement in sensory-motor integration of severely and moderately retarded children did not result in improvement in adaptive behavior. In a five-year longitudinal study, McIntosh and Warren (1969) noted the effects of special programs on the adaptive behavior of severely and profoundly retarded children. They found that the programs did have some facilitating effect but only to a limited degree.

Despite the limitations of specific instruments, the concept of adaptive behavior and the content of adaptive behavior scales provide some resources for the development of a curriculum for moderately retarded individuals. At the very least, the research and training programs generated by these scales have demonstrated that it is possible to identify and teach social skills to the moderately retarded.

A careful evaluation of the AAMD scale measure undertaken at the Willowbrook State School (Alperin et al., 1971) found that, although requiring extensive time and staff, administration of the Adaptive Behavior Scale to the school population could be useful for both program design and evaluation. Three other scales (Kapfstein, 1971; Ginn, 1973; Rolland, 1970) have also been noted as having potential utility in the planned curriculum.

D. Curriculum research. Kirk (1964), Guskin and Spicker (1968), and Evans and Apfel (1968) have each examined a series of studies that attempt to assess the efficacy of special class programs for moderately retarded children. Major aspects of selected studies and conclusions of the above reviews will be considered in this section.

Representative is Kirk's conclusion that investigators have had a difficult time establishing the benefits of special class training for this group. Further indication of the inadequacies, misinterpretations, and inappropriateness of curriculum guides for moderately retarded is apparent in representative studies of the moderately retarded in their postschool placement in which they are required to apply the skills, knowledge, and attitudes developed prior to their vocational placement (Spicker and Guskin, 1968; Kirk, 1964).

Cain and Levine (1963) investigated the effects of community and institutional school training for moderately retarded pupils in curriculum content and instructional procedures. To gather this information, the researchers developed an observational schedule that found that:

> Approximately 44 percent of the community classroom time was categorized as instructional and 56 percent was categorized noninstructional. Of the instructional time, approximately 25 percent was considered to be instructional social competence, half of which was judged low adequacy and half judged high adequacy. Seventy-five percent of the instructional time was categorized as instructional general. Of the total institutional classroom time, 35 percent was categorized as instructional and 65 percent as noninstructional. Of the instructional time, approximately 25 percent was categorized instructional social competence, all of which was judged as low adequacy (Cain and Levine, 1963, p. 45).

As a result of the above findings, Guskin and Spicker (1968) concluded that "two of the major reasons why special education programs for the TMR have not been shown to facilitate social competency are inadequacy of curriculum content and poor teaching. The need for drastic improvement in the training of teachers of the trainable appears to be most important implication of these findings" (Guskin and Spicker, 1968, p. 269). Cain and Levine (1963) concluded further from their research that "the public and institutional school programs, as they are now conducted, do not foster the social competency development of TMR beyond that of children not attending such programs. The data does not indicate that school programs cannot be effective but rather as they are presently operating they are not effective." Hudson (1955) stated that "one of the problems in education of the moderately retarded child is that while curriculum materials are beginning to be published, there is no theoretical framework to tie the whole together." In the 1958 study of methods in 29 public school classes for moderately retarded children in Tennessee, Hudson reported seven problem areas:

1. controlling individual and the group,
2. getting children willing to start and continue working,
3. building experience of present children,
4. structuring or guiding the children,
5. encouraging cooperation in interpersonal interaction,
6. providing for a mind-set or attention,
7. drawing from children (as opposed to pouring in).

Tobias and Gorelick (1963) studied the feasibility of training moderately retarded adults who were considered to be "unsuited for vocational activity" to complete a simple salvage task, which required the removal of a wing but from a threaded bolt, thus freeing the washer. The researchers investigated the relationships of productivity to IQ, the effect of continual practice on productivity, effect of deferred monetary incentive on production rate, effect of fatigue on productivity, and measure of work tolerance. The results indicated that production was significantly related to measured intelligence. An IQ of 20 constituted the approximate limit below which their work was an unsuited activity. However, subjects with IQs between 20 and 50 were shown to be good candidates for the industrial skills represented in this study.

Huddle (1966, 1967) investigated the effects of competition, cooperation, and monetary rewards on the performance of a 17-step assembly of a television rectifier by subjects with a mean IQ of 41.94 (CA=27.44 years and MA=11.3 years).

He found that: (1) there are positive behavioral effects on subjects receiving monetary incentives that may generalize to other areas, (2) subjects responded to incentives, amount of supervision, and intrinsic motivation, (3) elements of competence may be primary factor in work performance of moderately retarded, and (4) poorest work situation for moderately retarded is in a competitive situation with no tangible rewards.

Dye (1971) investigated the effects of social satiation on speed of performance of a visual recognition task by normal mildly and moderately retarded subjects. Dye concluded that intensive satiation generally increased the speed of all three groups; however, increased speed of the moderately retarded subjects were greater than those of either normal mildly retarded subjects. In a study of patient variables associated with vocational efficiency, Bae (1968) found that the factors differentiating "good" trainees were not IQ, academic achievement, CA or length of institutionalization, but better work ability, better work habits, and better interpersonal behavior. Brown, Bellamy, Perlmutter, Sackowitz, and Sontag (1972), in their study of the job capabilities of retarded individuals, found that gainful employment was often impeded by incomplete or inaccurate performance on a work task, insufficient production rates, inappropriate social behavior, inadequate work attendance, and unacceptable variability in work performance over a period of time. The researchers concluded that the impediments may be more closely related to training inadequacies and to the arrangements of events in work environment than to deficits in the individual. In a study of sheltered workshop programs, Cohen (1966) indicates that the program should not particularly stress the specific skill required for a particular job, but rather the general work habits and attitudes that any employee needs for successful employment, including punctuality, dependability, personality habits, cooperation.

Motor training is one aspect of curriculum for the moderately retarded that has received a great deal of attention in recent years. Numerous theories have been developed to "bridge the gap" between motor development and cognitive functioning. Kephart (1960) says that motor learnings are the basis of one's knowledge of self and world. Barsch's (1967) "moviegenic" program claims that through motor activity, in which the child gains body knowledge and through which his motor acts become habitual and automatic, he will then think about reading, writing, and other cognitive acts. Smith and Smith (1966) have emphasized psychomotor control on which symbolic activities depend. They further advocate teaching systematic space-organized motor patterns.

The research with the moderately retarded and motor training has primarily focused on which theory or kind of program is "best." Kershner (1968) discusses the work of Delacato who claims that a potential for remediating both the physical and intellectual deficits of moderately retarded children is through the application of a specified program of physical activities. Shoman (1967) found that the conventional methods of teaching the moderately retarded to perform motor skills were better than a movement patterning program. Goodwin (1971) compared the effects of selected physical education programs on trainable mentally retarded as they pertain to their physical fitness, IQ, and social maturity. The findings indicated a significant difference in the physical fitness of subjects with the traditional physical education program being the best. Daw (1964) found that a program emphasizing general muscular control and coordination rather than one involving specific physical skills was more helpful in the improvement of the body image of mentally retarded students. Taylor (1969) found that an organized physical education program has a positive effect on the motor development, academic, and social performance of trainable mentally retarded.

Richardson (1970), in evaluating the effects of two motor training programs on trainable mentally retarded, concluded that he was not able to prove that psychomotor ability was related to intellectual and social development. "Physical development is one area in which the retarded child can achieve a degree of normalcy that could generalize widely in the form of increased motivation and self confidence," (Kral, 1972, p. 14). Further discussion stated that a physical education program for the retarded provides the opportunity to improve health, as well as motivation. Physical education is also an area in which the mentally retarded can acquire "success" experience within their individual capacities. Kral also indicates that attention to motivational variables, the development of success orientation, has been left out of traditional approaches to special education. Success in the area of physical education can form a basis for generalizable self confidence.

Wessel is developing a physical education-based curriculum specifically designed to enable moderately retarded children to attain "socio-leisure" competence (Wessel, 1972, p. iii). Beginning with basic movement patterns, the curriculum progresses to encompass a variety of games and sports, as well as content and skills related to general cognitive development, affective development, and social adjustment.

A number of curriculum guides have outlined objectives and procedures for teaching the moderately mentally retarded (i.e., Molloy, 1972; Baumgartner, 1960; Rosenzweig and Long, 1960; and Frankel, Mapp, and Smith, 1966).* In addition, many local school districts and some state departments have produced their own guidelines. These guides and programs show an overlap in such areas as:

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*The curriculum guides which have been reviewed are listed in the bibliography of this paper. This paper also draws upon an earlier review (Evans and Apfel, 1968).

1. preparation of lesson plans, age-specific goals, specific activities and techniques related to them,
2. organized time schedules,
3. objectives and lessons differing from group to group, depending on ages and specific strengths and weaknesses,
4. some provisions for individual programming.

Furthermore, the guides consistently emphasize competence in five discrete areas:

1. self-help skills which include dressing, eating, personal hygiene, home safety, and other areas leading to the development of independent functioning.
2. language and communication, which primarily stress expressive language skills. Some guides include activities for listening and the development of receptive language skills.
3. social skills - the child is usually taught or trained to greet visitors, how to behave in specific situations (i.e., restaurants, stores), how to play with other children, and to some extent introduced to his environment by means of field trips.
4. economic usefulness - this area usually includes the development of vocational skills, which is usually not found until the intermediate level of the children's education.
5. motor development - includes activities in fine, gross, sensory, and perceptual areas of development.

Essentially, the studies reviewed have indicated that curriculum development for the moderately retarded needs to encompass the development of the skills, attitudes, and knowledge needed by the individual to think critically and act independently in any environment.

> In order to develop the maximum potential for personal and social adjustment and economic usefulness, a program designed to inculcate the formation of acceptable habits can be instituted which enables home, school, and community to offer reinforced practical experience training. In doing so, the schools would provide a curriculum of structured experiences based upon individual growth needs and capacities for group living in a restricted environment (neighborhood or institution), the community would afford recreational opportunity to reinforce the habit training program; and the home would become a laboratory for the utilization and testing of the effectiveness of the combined efforts. (Goldberg and Rooke, 1967, pp. 128-129)

While many authors have been concerned with the content of instruction and the setting for instructing these has been almost no concern with teaching methods (Haring and Schiefelbusch, 1967). Evans and Apfel's (1968) extensive refers to only two approaches: music and operant conditioning. The use of music as a major teaching method appears to be of very limited applicability.

Previous sections of this paper have referred to the numerous studies which have demonstrated the efficacy of techniques based on Skinnerian psychologies. This paper has not attempted to review all such studies or even a representative sample of all the teaching approaches generated within the behavior modification or experimental behavior analysis framework. There are numerous other sources available (Selzer and Mayer, 1972; Niesworth and Smith, 1971; Greene, 1966; Lovitt, 1970). However, the potential of such techniques for facilitating the education of moderately retarded individuals is just beginning to be realized.

An outstanding example of such an approach is Project MORE (Schiefelbusch and Lent, 1973). Project MORE plans to develop and disseminate a variety of programs dealing with self-help skills, which have been identified as important for the successful adjustment of adults in the community. Following a rigorous task analysis procedure, a specific program is designed, including all media needed for successful instruction. Field testing, evaluation, and revision are essential steps in the development process. Project MORE plans to develop programs in six areas: personal appearance, personal hygiene, mealtime skills, communication, following directions, and homemaking skills.

A further example of teaching methods derived from operant theory is in the work of Turnure and Rynders (1973). Using modeling and manual guidance procedures based on the Bondurn and Walters social learning approach, Turnure and Rynders have examined applications to discrimination learning of moderately retarded individuals.

A different approach to methodology is exemplified by the inductive teaching approach used by the Social Learning Curriculum. The applicability of this method with moderately retarded children will be considered in the final section of this paper.

In summary, the characteristics attributed to the moderately retarded and the educational goals and objectives proposed for programs for them have failed to recognize the moderately retarded as individuals who possess the same characteristics and needs represented in the real world of all human behavior. Moderately retarded individuals are part of society and therefore should not be treated as a separate category or educated as an amorphous group if they are ever expected to achieve any degree of social competence. Thus, it is the task of curriculum developers to develop skills, knowledge, and attitudes needed for the individual to function successfully in his environment. To function adequately in our society, every individual, irrespective of his physical and mental status, is expected to be able to "read" his environment. That is, he must recognize the criteria for social adjustment and then perform in such a way that he does not attract the disapproval of others he interacts with (Goldstein, 1969). Successful attainment of the objectives of education for any individual is determined by the increased ability of the individual to function wherever he may be.

Implications for Curriculum Development

The most striking implication of all the research received in this paper is that there is no such thing as a trainable mentally retarded person. That is, no one appears to have been able to identify a set of behavioral characteristics that enable us accurately to set apart one group of individuals from another. What is clear, though, is that there is a broad continuum of human abilities and that individuals may differ in the degree to which they exhibit any of these characteristics. Thus, it becomes possible to identify a set of universal skills and goals while designing a variety of means of attaining these skills and goals. It is the latter activity with which this paper deals.

Why, then, does the paper (and the curriculum) carry the label "moderately retarded"? Only, for the moment, to communicate as clearly as possible, as discussed in the introduction. Our concept of varying degrees of retardation refers primarily to differences in rate of development rather than to presumed differences in the laws of development or learning. However, this difference does lead us to prescribe differences in the content and teaching methodology, as well as in the rate of presentation, while maintaining an overall congruence of objectives for all individuals.

In order best to meet the needs of the moderately retarded, at least three aspects of education need to be modified. First, the period of formal instruction should be lengthened. Second, the number of instructional settings should be increased. Third, the areas of instruction must be broadened.

By increasing the period of formal instruction, the moderately retarded child is afforded additional opportunities in which to acquire the skills he needs. The period of instruction may be lengthened by increasing the number and length of instructional days, lowering the school entry age and/or raising the school learning age. The need for this type of modification has been recognized by many communities, which have already begun offering pre-school as well as adult programs.

Time is often treated with great extravagance and yet it is one of our most limited resources. A teacher in a typical school setting has well under 1,000 hours per year of instructional time. Each activity to be conducted in a classroom must be carefully evaluated to be certain it provides a good return on time spent.

Related to this is the largely unexplored question of critical periods and adult learning. Most programs operate on an assumption (often implicit) that learning essentially halts somewhere between the ages of 16 and 21. However, it may be possible that certain skills that the moderately retarded child is unable to acquire can be more readily learned by a moderately retarded adult. Upper age limits for learning may be more flexible than is generally assumed. If so, there could be a shift in the definition of school age as well as in the sequencing of content. The content of education should be arranged so that concepts and skills are taught when they are most needed and when the individual is best suited to learn them.

The number of instructional settings available contribute to increasing the period of instruction. That is, program components that extend instruction to the home and other out-of-school settings (e.g., after-school recreation) can provide opportunities for the systematic application of skills learned in school. The realization of this goal is dependent on coordination among all sites.

Finally, and perhaps most basically, it is necessary to broaden the areas of instruction. Along with the slower rate of development of moderately retarded individuals, goes a lag in incidental learning. Thus, skills that many children acquire almost automatically require specific instruction if they are to be learned by moderately retarded individuals. The research indicates that motor, self help, and language skills are the two areas most frequently identified as those in which moderately retarded individuals require intensive instruction.

The review has clearly indicated that in addition to the content already included in the Social Learning Curriculum, additional emphasis will be critical in the area of language. Since communication is one of the most basic characteristics of the human species, an effective curriculum must include instruction in these skills. A number of programs have been identified that focus on specific aspects of language development and these will be incorporated into the framework of the Social Learning Curriculum.

The acquisition of appropriate adaptive behaviors should be the keystone of a total educational program for mentally retarded children. Traditional subject matter areas are seen as vehicles for social adaptation and are important mainly because they are contained in, or are necessary to the acquisition of concepts, facts, and behaviors inherent in social adaptation. Therefore, the Social Learning Curriculum puts primary emphasis on social, interactional, and behavioral learning.

This is done within a framework that stresses the attainment of the dual goals of critical thinking and independent behavior. To be able to think critically means to be able to draw on stored and immediately available knowledge for the purpose of making a decision. To be able to act independently means to initiate and carry out activities to a satisfactory conclusion.

There is nothing in the research literature or the experiences of educators that suggest that mentally retarded children cannot learn to think critically and act independently. The limitations will appear only in the level of attainment of these abilities. The crucial task for educators is to select from an infinite array of facts and concepts those having immediate as well as long-term relevance for social-personal adaptation to society. Educators must devise teaching-learning methodologies that will not only assure acquisition of facts and concepts but also develop in students the skills that will permit both critical thinking and independent acting.

The typical approach to curriculum, resulting in a fragmented, compartmentalized presentation of separate skills, effectively limits the scope of potential adult behaviors. An approach that attempts to interrelate areas of behavior seems more likely to nurture the occurrence of generalization and transfer of learning. Furthermore, a curriculum combining content with specific teaching methods is likely to be the only means of realizing such a goal.

Existing curriculum guides for the moderately retarded seem to reflect a view of educational programming that has focused on teaching the "useful" things needed for daily living (i.e., toileting, street signs, climbing stairs). This traditional approach places great emphasis on time schedules, lesson plans, and age-specific goals). Often, there appears to be more concern with shaping the individual to fit a preconceived notion of his niche in society than with enabling the individual to develop to the full extent of his own capabilities.

This traditional approach to curriculum is not necessarily bad or wrong. However, it is too strongly tied to deficiency models (Kirk, 1955, 1957; Heber, 1969; Magory and Eichan, 1961) and too often falls victim to weak implementation:

> ...past history has indicated that the social competency criterion as an organizing principle for the curriculum has been implemented on too narrow a base by teachers of the moderately retarded. As such, it has resulted in a curriculum which has degenerated into a schoolday with long noninstitutional recreation periods (i.e., development of socialization skills, and training in limited self-help skills taught in such an artificial manner as to preclude useful transfer to the real world (Stearns and Keith, 1967, p. 2).

However, the Social Learning Curriculum closely matches the curriculum model with the teaching model. By doing so, it seeks to avoid a fragmentary presentation of isolated skills. The Social Learning Curriculum will not develop "new" content areas as such. It will organize content so that moderately retarded children may acquire, systematically and sequentially, the skills, knowledge, and attitudes needed for self-realization and success within the community.

In planning the content of such a curriculum, it will be necessary to consider factors that may indicate the most "cost-effective" procedures. Cost-effectiveness must be measured in terms of both finances and time. There are many educational procedures that can be carried out within the typical school setting only by a very expensive duplication of replicas of facilities already existing in the community (e.g., workshops). It may often be more economically feasible to consider changing the locale of education.

A unique feature of the Social Learning Curriculum has been the prescription of a method of instruction as well as of content. The method selected, inductive teaching, was chosen because of its expected consonance with one of the primary goals of the curriculum - the development of critical thinking. While the curriculum for the moderately retarded shares this goal, the means of achieving it must be tempered to consider the entry skills of the target population.

The inductive teaching procedure used in the Social Learning Curriculum appears to be heavily dependent on high-level verbal skills. The latter are strongly valued in our societal structure and so the development of needed verbal skills becomes one of the key goals of the curriculum. However, skills contributing to verbal proficiency, critical thinking, and independent behavior may be developed through alternative teaching methods. In recognition of the need to match the teaching method to the characteristics of the learner and to the nature of the content, the curriculum for the moderately retarded will explore a variety of available teaching methodologies. The method best suited to each section of the curriculum will be selected and incorporated into our material.

The studies reviewed in the section on language indicated that, with carefully planned instruction, linguistic achievement of the moderately retarded may be enhanced. The skills so developed can be used to further problem-solving skills. Milgram and Furth (1963), in a unique study, demonstrated that subjects with IQs below 50 could learn to use verbal mediators to aid them in solving a problem.

As the component skills of inductive learning are identified, it is hoped to design specific instructional programs aimed at developing these skills in children. That they are able to learn many related linguistic skills has been indicated in a previous section of the paper. The techniques used will be drawn from all areas of research that have demonstrated the particular utility of a given method vis-a-vis some specific content.

Behavior modification and related procedures derived from Skinner's operant conditioning paradigm appear to be among the most frequently recommended instructional procedures. Other sections of this paper have comprehensively reviewed the many specific applications of this method. While most practitioners have concentrated on using operant techniques to develop highly specific skills, our program expects to capitalize on the possibilities of developing generalized abilities and independent behavior through these procedures. Furthermore, the emerging field of experimental analysis of behavior, a more sophisticated derivative of behavior modification, offers powerful tools for analyzing the teaching-learning process. It is fascinating to note that it is these techniques, developed by behaviorists, that are helping to realize Jerome Bruner's often paraphrased dictum that it is possible to teach anything to anyone.

An approach related to behavior modification is represented by Bandura's (1971) social learning theory. According to this theory, many kinds of learning may be accounted for by modeling. That is, subjects who are given the opportunity to observe a desired behavior may subsequently imitate that behavior. This imitation can be strengthened by appropriate reinforcement procedures. Although there has been little reported use of this approach with moderately retarded children in classroom settings, recent application to language instruction (Carroll, et al., 1972) and social skill training (Ross, 1970) indicate that it has some promise.

More recently, attention has been called to the method of manual guidance originated by H. Carr, "which requires that the subject be physically guided through the actual motions of the response he is to acquire" (Turnure and Rynders, 1973, p. 49). These authors found that both modeling and manual guidance resulted in more rapid learning of a two-choice discrimination learning problem than did trial-and-error learning. Furthermore, manual guidance resulted in subsequent acquisition of the task by those subjects who had been unable to solve the problem through the use of trial-and-error methods.

As each activity of the Social Learning Curriculum for the moderately retarded is planned, the instructional strategy will be planned to make use of procedures that enhance current skill development while contributing to the achievement of long-range goals. At the earliest stages, behavior modification and the related approaches of modeling and manual guidance will be used to institute initial language movement and problem-solving skills. As cognitive and linguistic development progresses, increasing use will be made of more verbal problem-solving approaches (inductive teaching). In addition, we will explore the possibility of devising an inductive teaching procedure less heavily dependent on verbal skills. Inductive teaching appears to be potentially compatible with operant techniques. Inductive teaching provides a system for the teacher to follow in helping the student to arrive at solutions to problems, whereas behavior analysis suggests the strategy for presenting the problem and responding to the child's solutions.

That is, although the major focus of inductive teaching is on antecedent events, the corresponding focus of operant techniques is on consequences.

In effect, it is the teacher's response that serves to insure repetitions of correct student response. This is particularly true with the moderately retarded child whose receipt of positive reinforcement may have been very meager because of his poor past performance. Using a consistent reinforcement approach becomes of paramount importance. For a child who has faced repeated frustration and failure consistent reward is of major importance. A combination of reinforcement devices and teaching strategies that plan a route to successful student response is most likely to result in maximum learning.

This combination of teaching techniques should enable the development of a broader variety of strategies. The ultimate result can be a means of truly individualizing instruction by individual prescriptions of content rather than by varying the rate of progress. This kind of individualization is frequently referred to as clinical teaching, clinical in the sense that it is a "continual diagnosis of individual children in areas of physical, social, sensory, perceptual, and intellectual development in addition to the child's interests and experiences and potential for learning" (Evans and Appfel, 1968, p. 24). Johnson (1969) indicates that "if special education for the moderately retarded is ever to achieve the goal of being clinical education, it is essential to:

1. carefully define their educational objectives,
2. select learning activities that have the skills, content, and attitudes that will aid the individual in accomplishing them, and
3. evaluate each child in terms of his unique characteristics and needs to determine both the content and method based upon understanding of developmental psychology, learning theory and dynamics of behavior to be used to enable him to become the most effective person that it is possible for him to be in the society in which he is living.

Most past attempts to develop a curriculum for moderately retarded children have focused on developing a relatively narrow set of specific skills. The skills selected have generally been those expected to result either in the most dramatic decrease in the efforts of others (ease management), increase the likelihood of social adjustment and/or independence, and avoid or postpone institutionalization. This has been a first-aid approach, dealing with the most obvious and crucial problems. Refinements, such as academics, leisure and activities, and so on have been added almost as an afterthought.

Furthermore, instruction in discrete skills precludes the probability of teaching children complete sets of social reactions or the ability to decide when it is appropriate to use a particular skill. That is, if an individual must wait for a verbal command before completing a task although he has gained some skill, it is considered a lesser skill than if the task is self initiated and completed. Teaching discrete skills also narrows the probability of generalization and transfer. If we assume that moderately retarded people cannot generalize or transfer learning, and proceed to teach them in ways that avoid making such demands, then we are insuring that they do not develop such skills.

Those who identify independent behavior and critical thinking as the major goals of education will stress the importance of an approach to teaching that emphasizes interrelated learnings, problem-solving strategies, and decision making. The discrete skills, which comprise the total of earlier curricula for the moderately retarded, in this context become means to ends rather than ends in themselves. That is, having taught the child the entire range of behaviors needed to successfully eat a meal, the instructional sequence must include opportunities to practice this skill in a variety of social settings, giving the child the opportunity to learn the variations that are socially appropriate in practice (i.e., eating at home, as a guest in someone else's home, and on a picnic).

An educational program cannot possibly hope to provide instruction in every possible life situation that an individual will experience. Therefore, it must try its best to provide every individual with the tools needed to perceive, judge, and select the variables in a situation that determines the appropriate behavior. The Social Learning Curriculum attempts to do this through a unique structuring of content and by an integration of content with teaching methodology.

Procedures for Curriculum Development

We see mentally retarded children and youth as constituting a continuum of cognitively, perceptually, motorically, and affectively disabled children. The point on the continuum occupied by any one child is a function of his status with respect to balances and imbalances in all four characteristics. Historically, development efforts represent only a cross section of the continuum of education for children who do not meet perscribed norms for adaptation. However, a curriculum based on a philosophy of continuity would be more open-ended. It has been our intention from the onset of the present endeavor to construct an educational program independent of preconceived and pre-established CA and IQ categories by structuring the substance in a developmental sequence consistent with the maturation of children.

Our review of research generally supports this position. The evidence indicates that the development of moderately retarded children generally follows the normative sequence and obeys general laws of learning. However, there is a marked difference in developmental rate; the implications of this were explored in the previous chapter. Therefore, it becomes possible to accept and implement the existing Social Learning Curriculum with this group of youngsters.

The goals and content of the Social Learning Curriculum are seen to be as appropriate for moderately retarded children as they have been found to be for mildly retarded children, although the curriculum as it currently exists makes a number of assumptions concerning learning rate, entry skills, and incidental learning. It is clear, though, that a variety of changes need to be made. The lessons will have to be analyzed carefully to identify the built-in assumptions. Where necessary prerequisite skills are involved, new lessons will be added. The evaluation procedures will be made more precise as an aid to teachers selecting appropriate content. New lessons may become integrated within a Phase or presented as supplementary instructional activities, to be used as needed, each of which comprises a precise program to develop skills identified as prerequisite for Social Learning Curriculum lessons.

Information from the survey (Bepko, Reiss, and Alter, 1973) as well as from the review of literature suggests that there are three Phases that will need to be expanded or added in the modification of the Social Learning Curriculum for the Moderately Retarded. These have been tentatively labeled Play, Sensory Awareness, and Achievement. In addition, as has been mentioned, a language component and a perceptual motor skills component.

In effect, the Social Learning Curriculum for the moderately retarded will consist of three independent but closely interrelated components: social learning activities, communication skills, and perceptual-motor skills.

Activities within each area will be presented separately but will be cross-referenced. This will enable teachers effectively to gear the teaching of prerequisite skills to the presentation of social learning content.

Play is a phase that will build on the motor skills while emphasizing their applications in social situations. This Phase will be concerned with using childhood games (particularly those common in the child's home) as means of teaching social skills such as sharing, taking turns, and following simple rules.

The phase tentatively titled Achievement deals with a group of concepts and attitudes that reflect an individual's attempts to attain success. White's concept of competence probably comes closest to typifying the major emphasis of this Phase. It will also be concerned with learning to learn, learning set and achievement orientation. The objective of this phase will be to enable the individual to conceptualize himself as a person who can learn, who can actively engage himself in learning, and who can achieve successful outcomes. It is uncertain if this can best be accomplished through a specific Phase or if it would be more effective to consider this as an attitude that should be nurtured by lessons in several Phases.

In addition, a Phase dealing with the interpretation of sensory information will be developed. The learnings of this Phase will revolve about all of the kinds of information that can be obtained through the various sensory channels. The vocabulary needed to help communicate such information represents a major acquisition for children. There will also be opportunities for classifying, sequencing, and integrating information from multiple input sources.

The sequencing of these Phases will be determined well in advance of classroom use. It is expected that developmental norms will be helpful in this respect. The experiences of classroom teachers will provide some guidance for selecting the sequence not only for these additional phases, but for the sequence of all content as the Social Learning Curriculum is modified.

This adaptation of the Social Learning Curriculum for the moderately retarded will rely heavily upon the input and expertise of teachers currently working in classroom programs with this group of children. Teams of teachers (approximately four to a team) will be selected to participate. Selection was based on nomination by the local supervisor, followed by observation by Center staff members.

Each teacher within a team will present each lesson of a Phase with her class. A handbook will provide specific guidelines for the adaptation of the curriculum. At an initial conference, the Center staff and the teachers will examine the behavioral objectives and prerequisites for each experience of the Phase. At this time, objectives may be deleted, modified, or added. The last two alternatives will require, in addition, the modification of an existing lesson or the development of a new lesson. This may be done by any member of the writing team. Copies of the new experience will be provided for all other members.

During the succeeding weeks, each teacher will present each lesson to her class. Any modification in the experience will be recorded on printed forms. Each teacher will be visited once a week, at which time she may be observed using an activity, may discuss any questions or problems, and may review evaluation forms. All evaluation forms will be compiled at the Center; recommended modifications will be compiled periodically. Monthly team meetings in each school will monitor and discuss the progress of the adaptation. In addition, when all participating teachers have completed presenting the Phase to their classes, a writing conference will be held at the Center for a final review of all modifications. This meeting serves to prepare for the modification of the next Phase.

It is anticipated that the modification of each Phase will require approximately four months. This allows sufficient time for each teacher to present each lesson (in either the original or modified version); furthermore, it allows time for the development of new lessons that have been identified as needed during the initial conference on each Phase.

This critical stage of modification and development of curriculum for the moderately retarded may be considered the pilot stage because it will serve the purpose of more accurately determining the time needed to complete Phase modifications, effectiveness of the guidelines for modification, and effectiveness of the teacher-Center relationship. Refinement of procedures may reveal means of speeding some aspects of the development procedure. Following this stage, the materials will be readied for formal field testing on a broader scope.

The significance of involving classroom teachers as the "adapters" of the Social Learning Curriculum is that the teachers are in the best position to manipulate all aspects of an activity, i.e., the child, language, movement, and environment. Because of the great influence of the teacher on an activity, there needs to be a close working relationship between Center staff and teachers. Therefore, we are looking not only for ways to modify the Social Learning Curriculum activities, but also for the most viable way to maximize teacher input and Center output. Thus, teachers will constructively engage in Social Learning Curriculum modification, and the Center will not only edit the teacher's work, but also serve as a source for helping the teacher to become a "better" teacher.

However, we will need to be careful to avoid limiting the applicability of our materials to a traditional classroom setting. Moderately retarded children participate in instructional programs in a variety of settings. The material provided must be sufficiently flexible for implementation by people in various roles (teacher, paraprofessional, parent) in a variety of settings (school, home, group residence, and the like).

The Social Learning Curriculum model for the mildly retarded will serve as the framework for adaptation of the Social Learning Curriculum for use with the moderately retarded. The phases, which provide the basis for organizing the content of the curriculum, will remain essentially the same as the original with the possible elaboration of three of the need areas into additional phases: sensory awareness, achievement orientation, and play. Experience gained during the field-based development may identify additional phases that need to be developed.

Accompanying the Phases will be material designed to present needed perceptual-motor and language skills. In addition, there may be material for a parent-administered home segment of the total program. Self-help skills often viewed as a major focus of programs for the moderately retarded, will be developed as applications of language and motor skills within an appropriate social framework. At the Self (primary) level of the curriculum, we will incorporate such skills as feeding, dressing, toileting, and personal hygiene. At the Home and Family (intermediate) level, the curriculum can easily include skills related to food preparation and home maintenance. Finally, at the secondary level, self-help skills focus on more directly vocational content.

Long-range planning at the Center provides for the ultimate development of a program that extends as a continuum from zero performance to norm-meeting performance. The total program is being developed in section, which will eventually be joined. We have, with some arbitrariness, isolated a portion of the total continuum and identified it as the focus of this development project.

The overall framework of the Social Learning Curriculum can be expected to prove as relevant to the needs of moderately retarded children as it has proven to be for the mildly retarded. An approach stressing the applications of sets of skills in appropriate social situations would certainly seem to be highly viable for all children. The terminal goals for the mildly retarded have been considered in terms of the abilities to think critically and act independently within the context of adult life in the community. The goals for the moderately retarded are essentially similar, differing only in scope. That is, we may expect them to exercise critical thinking and a degree of independent behavior, but within the narrower (more protective) environment of the hostel (or other group residence) and the sheltered workshop.

BIBLIOGRAPHY

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Introduction

The compilation of his bibliography is intended to serve two purposes. Its primary function is to review the literature prepared for the working paper written as a guide to the development of the Social Learning Curriculum for moderately retarded children. Second, it is viewed as the foundation for an information storage/retrieval system to be used both by Center staff and other individuals.

The bibliography strives to list all materials that have been published from 1960 to March, 1973 (materials published after that date will be added as they become available). Publications appearing prior to 1960 are few in number; those having had significance for educational practice are assumed to be discussed in later publications which have been reviewed.

We conducted the following searches to compile the bibliography:

1. PASAR and ERIC computer searches using the key phrases "trainable mentally retarded" and "moderately mentally retarded."

2. Hand searches of the International Bibliography on Mental Retardation, Mental Retardation Abstracts (vol. 1 to current issue), Psychological Abstracts (1972 to current issue), Exceptional Children Education Abstracts (vol. 1 to current issue), and Research in Education (vol. 1 to current issue).

3. Searches of selected individual journals for their 1972-3 issues.

Each user of this bibliography is invited to notify the Center of any omissions. Please send us either a copy of the article or a citation. Future editions of the bibliography will then be expanded to include this material.

In the area of experimental behavior analysis, only review articles and theoretical discussions have been included; many specific studies have been omitted at this time owing to the volume of such research. In the future, it may be possible to distribute a special bibliography on this topic. Studies of measurement issues have been limited because of the specialized nature of the material. This topic may also be the subject of a specific bibliography.

The current bibliography is presented in two versions. Part 2 is a complete alphabetical compilation. Part 1 is divided by major subject areas, parallel to the division used in the working paper (program, learning, communication, social). Some areas not specifically covered by the paper have been included, but are generally not as complete as are educationally relevant areas.

On the line following most citations will be found a list of numbers that characterize the kinds of information found in the article. These numbers are explained in Table I (p. iii). Each number reflects a category to which the article may be assigned. Eventually, one could generate specialized bibliographies by a combination of these key terms. Entries lacking these notations are generally those which could not be obtained for review.

Finally, it may be noted that many ephemeral materials (i.e., those not formally published) have been included in this bibliography. The Center has a copy of each of these items although they typically have not been widely distributed. Individuals seeking access to such items should write to the author.

TABLE I: KEY TO BIBLIOGRAPHIC CODE

Numeral	Information Reported in Item
1	IQ Score
2	Mental Age
3	Chronological Age
4	Sex of Subjects
5	Other handicapping conditions
6	General information (review or bibliography)
7	Sensory
8	Motor
9	Perception, Organization, Memory
10	Cognition, Learning, Academics, Skills
11	Communication
12	Affective
13	Social/Family
14	Vocational/Occupational/Self-help
15	Health/Medical/Etiology
16	Socio-economic status, Racial, Ethnic
17	Diagnosis, Measurement, Assessment
18	Maturation
19	Behavior Modification
20	Programs, Curriculum
21	Materials and Equipment
22	Staff
23	Locale (physical property)
24	Environmental Influences

Part I: Topical Listing *

A. Learning Characteristics

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